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**OXFORD REGIONAL IN-SERVICE TRAINING COURSE  
IN CLINICAL PSYCHOLOGY**

**DOCTORATE IN CLINICAL PSYCHOLOGY**

**THEORY OF MIND IN A 'TREATMENT RESISTANT' SCHIZOPHRENIA  
SAMPLE DETAINED IN A SPECIAL HOSPITAL: ITS RELATIONSHIP TO  
SYMPTOM PROFILES AND NEUROPSYCHOLOGICAL TESTS**

**DAVID MURPHY**

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## Contents

	Page
List Of Figures & Tables	iv
Acknowledgements	vi
Abstract	vii
<b>1. <u>Introduction</u></b>	<b>1</b>
1.1 A Symptom Approach To Schizophrenia	1
1.2 Cognitive Deficits In Schizophrenia	3
1.3 Non Social & Social Cognition	5
1.4 Social Deficits In Schizophrenia	6
1.5 Theory Of Mind (ToM)	8
1.6 ToM & Schizophrenia	11
1.7 Studies Of ToM In Schizophrenia	14
1.8 ToM In Forensic Patients	18
1.9 Present Study & Hypotheses	20
<b>2. <u>Method</u></b>	<b>24</b>
2.1 Design	24
2.2 Participants	24
i. Treatment Resistant Schizophrenia Sample (TRS)	25
ii. Personality Disorder Controls (PD)	25
2.3 Measures	25
i. ToM Task	25
ii. Symptom Rating Checklist (SRC)	26
iii. Neuropsychological Tests	27
WAIS-R Full Scale IQ	28
WMS-R	28
CFT	28
Classical Weigl	29
2.4 Procedure	30
i. Ethical Approval	30
ii. Participant Consent	31
iii. Research Interview	31
<b>3. <u>Results</u></b>	<b>32</b>
3.1 Demographic Information	32
i. Age Of Participants	33
ii. Number Of Years Detained In Special Hospital	33
iii. Age At First Psychiatric Diagnosis	34
iv. Duration Of Illness	34
v. Educational Qualifications	35
vi. WAIS-R Full Scale IQ	36

3.2	Inter-Rater Reliability Of SRC	36
3.3	Symptom Profiles & ToM Performance	37
i.	First Order Reality Questions	38
ii.	First Order ToM Questions	38
iii.	Second Order Reality Questions	39
iv.	Second Order ToM Questions	40
3.4	Second Order ToM Performance & Neuropsychological Test Performance	43
i.	Comparison Between ToM Performance & WAIS-R Full Scale IQ	43
ii.	Comparison Between ToM Performance & WMS-R Performance	44
iii.	Comparison Between ToM Performance & CFT Performance	47
iv.	Comparison Between ToM performance & Classical Weigl	49
4.	<u>Discussion</u>	51
4.1	Summary of Results	51
i.	Demographic Details	51
ii.	Inter Rater Reliability Of SRC	52
iii.	First & Second Order Reality Questions	53
iv.	First & Second Order ToM Questions	53
v.	Second Order ToM Performance & Neuropsychological Test Performances	56
4.2	Methodological Limitations Of Study	58
4.3	Theoretical Implications	61
4.4	Clinical Implications	64
4.5	Future Research	65
4.6	Conclusions	67
	References	70
	List Of Appendices	80

## List Of Figures And Tables

### Tables

	<b>Page</b>
1. Demographic Details Of Groups	32
2. Summary Table To Show Kruskal-Wallis One Way ANOVA Test Results For Demographic Details Between Groups	33
3. Mann-Whitney U Test Between Groups In Age	33
4. Mann-Whitney U Test Between Groups In Number Of Years Detained In Special Hospital	34
5. Mann-Whitney U Tests Between Groups In Duration Of Illness	35
6. Contingency Table Between Combined Distribution Of Educational Qualifications & Groups	35
7. Mann-Whitney U Tests Between Symptom Groups In WAIS-R Full Scale IQ	36
8. Contingency Table To Show The Level Of Inter-Rater Agreement For Assigning Twelve Participants Into One Of The Four Groups Using SRC	37
9. Kolmogorov-Smirnov Goodness Of Fit Tests For Each Group In Each Category Of ToM Task	38
10. Mann-Whitney U Tests Between Groups In Second Order ToM Questions	41
11. Chi-Square Test Results Between ToM Question Categories & Groups	42
12. Contingency Table Between False Belief Question Category & Groups	42
13. Contingency Table Between Deception Prediction Question Category & Groups	42
14. Contingency Table Between Deception Explanation Question Category & Groups	43
15. Mann-Whitney U Tests Between Second Order ToM Questions Passed Groups In WAIS-R Full Scale IQ	44
16. Mean WAIS-R Full Scale IQs By Number Of Second Order ToM Questions Passed	44
17. Mean WMS-R Prose Immediate Recall Scores By Number Of Second Order ToM Questions Passed	45
18. Mean WMS-R Prose Delayed Recall Scores By Number Of Second Order ToM Questions Passed	45
19. Mean WMS-R Design Immediate Recall Scores By Number Of Second Order ToM Questions Passed	45
20. Mean WMS-R Design Delayed Recall Scores By Number Of Second Order ToM Questions Passed	45
21. Kruskal-Wallis One Way ANOVA Results Between WMS-R Categories In The Number Of Second Order ToM Questions Passed	45
22. Mann-Whitney U Test Results Between Number Of Second Order ToM Questions Passed For WMS-R Prose Delayed Recall Scores	46
23. Mann-Whitney U Test Results Between Number Of Second Order ToM Questions Passed For WMS-R Design Delayed Recall Scores	46
24. Contingency Table Between Number Of Second Order ToM Questions Passed & Performance In The CFT Copy Sequence Ratings	48
25. Contingency Table Between Number Of Second Order ToM Questions Passed & Performance In The CFT Recall Sequence Ratings	49
26. Contingency Table Between Number Of Second Order ToM Questions Passed & Classical Weigl Ratings	50

## **Figures**

	<b>Page</b>
1. Mean Percentage Of First Order Reality & ToM Questions Answered Correctly By The Four Groups	<b>39</b>
2. Mean Percentage Of Second Order Reality & ToM Questions Answered Correctly By The Four Groups	<b>40</b>

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## **Abstract**

The understanding that others have beliefs or mental states different from our own is described as 'Theory of Mind' (ToM). ToM deficits may explain some symptoms of schizophrenia. However, there are few investigations of the occurrence of ToM deficits in schizophrenia patients, and none in a forensic setting. There is also the question of ToM's independence from other cognitive abilities.

This study compares ToM abilities in a sample of 'treatment resistant' patients diagnosed with schizophrenia (TRS) and patients diagnosed with a personality disorder (PD controls) resident in an English Special Hospital. Using a ToM task, no significant differences were found between groups in first order ToM (appreciation that another may have a false belief about the state of the world). However, the TRS sample were significantly more impaired in second order ToM (appreciation that another may have a false belief about the mental state of another individual) than PD controls. Patients with predominantly behavioural signs symptoms performed significantly worse than other symptom groups.

Comparisons between second order ToM performance and functioning on conventional cognitive tasks suggested significant relationships between second order ToM and general intellectual functioning, and delayed recall of prose and designs. Although no significant relationships were found between second order ToM and immediate recall of prose and designs, organisation and planning, there was with the ability to shift thinking from one concept to another.

Following a summary of the results, some methodological limitations of the study are discussed, along with theoretical and clinical implications and possible future research.

## **1. Introduction**

The following study examines the performance of a 'treatment resistant' forensic sample of patients with schizophrenia in a test of the ability to mentalize or represent the mental states of others, i.e. to have a 'theory of mind'. Its aim is to test the suggestion that this ability is impaired in specific symptom subgroups of schizophrenia, i.e. those with predominantly behavioural signs or paranoid delusions, compared to those with predominantly passivity phenomena symptoms. The relationship of theory of mind ability to general intellectual functioning, memory, organisational and planning skills, and the ability to shift thinking from one concept to another is also examined.

In the following sections, the scene is set for the study's rationale by providing a brief discussion of: the application of a symptom approach to schizophrenia research; the cognitive deficits which are often present within schizophrenia; the recent distinction between non social and social cognition; the social deficits in schizophrenia; the theoretical basis of studying theory of mind in schizophrenia and some studies in which this has been examined. The theory of mind ability of forensic patients is also discussed and why this may have particular consequences for the capacity to empathise. The final section describes how the present study will fit into the existing body of research.

### **1.1 A Symptom Approach To Schizophrenia**

Schizophrenia is often clinically heterogeneous in the presentation of its symptoms and there have been several attempts to identify distinct types. However, these have only been partially successful. The classic subdivision put forward by Bleuler (1911),

of paranoid, hebephrenic, catatonic and simple schizophrenia has proved to be unsatisfactory as many patients exhibit characteristics of more than one of the subtypes. A similar problem has occurred within other classification systems. Combined, this problem suggests the heterogeneity of schizophrenia may be better described in terms of syndromes which can coexist within a patient.

The division of schizophrenia into 'positive' and 'negative' symptoms is one attempt to describe identifiable syndromes. Crow (1980), suggests 'type 1' schizophrenia is characterised by positive symptoms and 'type 2' schizophrenia is characterised by negative symptoms, both reflecting independent dimensions of psychopathology and not being mutually exclusive. The distinction between positive and negative symptoms may also overlap with the distinction between acute and chronic schizophrenia; with negative symptoms tending to be chronic and positive symptoms tending to be characteristic of acute schizophrenic episodes. However, the overlap between problems when attempting to identify the pathological processes associated with a particular group of symptoms, may lead to the differences between acute and chronic pathological processes being confused with differences associated directly with symptom type.

Liddle (1987), attempted to overcome this problem. Using a factor analysis methodology of examining Present State Examination scores (PSE, Wing, Cooper & Sartorius, 1974), Liddle found schizophrenia symptoms can be separated into three syndromes: psychomotor poverty (poverty of speech, lack of spontaneous movement and various aspects of blunting affect); disorganisation (inappropriate affect, poverty of content of speech and disturbances of the form of thought); and reality distortion

(particularly types of delusions and hallucinations). This division of symptoms into three syndromes has subsequently been replicated with other patient populations with schizophrenia (e.g. Liddle & Barnes, 1990) and has been supported by neurophysiological investigations suggesting different patterns of cerebral blood flow associated with the different syndromes (Liddle, Friston, Frith, Hirsch, Jones & Frackowiak, 1992). Since their introduction, Liddle's syndrome clusters have become a widely accepted way of classifying symptoms in schizophrenia research.

As individuals may have symptoms from more than one syndrome, syndromes may not represent distinct types of schizophrenia. Alternatively, they may reflect discrete pathological processes occurring within a single disease. This suggests a fundamental abnormality in schizophrenia, which may be associated with one or more of the three distinct pathological processes and whose presentation may be dependent upon an individual's constitution and environment. It is likely that the supposed pathological processes responsible for the syndromes are either a cause or a consequence of some fundamental abnormality. By examining schizophrenia in terms of its symptoms, making predictions based upon the nature of these symptoms and devising tests which examine the cognitive function suspected of being deficient, there may be greater progress in understanding the disorder.

## **1.2 Cognitive Deficits In Schizophrenia**

Individuals diagnosed with schizophrenia are typically found to have impairments in a wide range of cognitive tasks. Such impairments include a general deterioration in intellectual functioning and loss of cognitive agility (e.g. Nelson, Pantelis, Carruthers, Speller, Baxendale & Barnes, 1990; Dunkley & Rogers, 1994), problems in sustaining

attention and efficient information processing (Nelson et al, 1990; Hemsley, 1994), difficulties in the organisation and planning of responses (Shallice, Burgass & Frith, 1991) and severe memory impairment (Tamlyn, McKenna, Mortimer, Lund, Hammond & Baddeley, 1992).

A number of studies have looked at the presence of cognitive deficits in schizophrenia patients in a forensic context. Krakowski, Convit, Jaeger, Lin & Volavka (1989), in a study comparing high, low and no violence groups of in-patients with schizophrenia, found both neurological and neuropsychological abnormalities differentiated the groups. These abnormalities were especially significant among the high violence group, with integrative sensory and motor functions being the central areas of impairment. In contrast, Lapierre, Braun, Hodgins, Toupin, Leveillee & Constanteau (1995), in a study of out-patient men who were assessed on various measures of lifelong history of violence, psychopathology, neuropsychological performance and neuropsychological intactness, found few indicators of a positive relationship between neuropsychological performance and violent physical aggression. However, the authors highlight the heterogeneity of their sample, such as the differing range of anti-social behaviours and levels of preserved functioning. Supporting the lack of any association between cognitive impairment and the tendency towards violence, Barber (1994), in an unpublished study comparing male Special Hospital patients with schizophrenia convicted of homicide and a matched control group of non homicidal patients with schizophrenia attending an out-patient clinic, found few performance differences between the two groups on a wide range of different cognitive tasks specifically targeted at executive functioning. Interestingly, a small, but insignificant tendency was found for the Special Hospital patients to achieve slightly better results.

In a recent investigation of Special Hospital patients with either schizophrenia or a personality disorder, Hill, Chesterman, Lumsden, Tidmarsh & Murphy (1997), found, although there were minimal differences between patient groups in terms of probable cerebral pathology, there were finer distinctions in the patterns of relative strengths and weaknesses in cognitive abilities. The most impaired abilities among patients with schizophrenia were those related to speed of information processing and to more general cognitive flexibility. However, variable levels of impairment were found in patients with schizophrenia, suggesting a detailed investigation of individual symptom presentations might be more informative. Overall, there appears to be some degree of inconsistency in findings across studies regarding the relationship between neuropsychological performance and history of violence. It also highlights the need for continued investigation of the complex relationship which appears to exist between history of offending, cognitive impairment and behavioural disturbance.

### **1.3 Non Social & Social Cognition**

The distinction between non social and social cognition is beginning to gain support (Penn, Corrigan, Bentall, Racenstein & Newman, 1997). Social cognition has been defined as that domain which involves the perception, interpretation and processing of social information (Ostrom, 1984). 'Social' in this context is taken to mean how we think about ourselves, other people and the interactions between them.

Although the presence of non social cognition deficits in schizophrenia appear well established, there are limitations as to how much these account for the large variance in social competence and functioning found among individuals with schizophrenia. Such non social cognitive deficit explanations also tend to omit the social context in

which cognitive functioning often take place. Furthermore, they fail to apply the same explanations to the social cognitive processes which may take place in non patient samples. The importance of social cognition is highlighted by premorbid social competence, which in some studies has been found to be the strongest predictor of outcome in patients with schizophrenia (e.g. Mueser, Bellack, Morrison & Wixted, 1990). Furthermore, social competence at discharge has been found to be inversely related to relapse rate (Johnstone, MacMillan, Frith, Benn & Crow, 1990). However, the relationship between non social and social cognition remains to be clearly established, particularly whether they represent different levels of cognitive analysis on the same continuum or are distinct entities.

#### **1.4 Social Deficits In Schizophrenia**

Impairments in social functioning are among the hallmarks of schizophrenia (DSM-IV, American Psychiatric Association, 1994). It is thought that a study of social cognition in schizophrenia may augment understanding of the clinical and behavioural manifestations of the disorder (Penn et al., 1997). The rationale for this comes from the view that schizophrenia is an interpersonal disorder in which problems result from faulty constructions of the social environment and one's place in it.

An early investigation of the social deficits in schizophrenia is provided by Diamond (1956), using a version of the autokinetic experiment to compare the performance of individuals with schizophrenia with the performance of emotionally disturbed individuals without schizophrenia. It was found that individuals with schizophrenia were unable to modify their responses to be consistent with the responses of another

person in an interpersonal situation. This was argued to support the notion that individuals with schizophrenia do not adequately internalise the views of another. More recently, a similar suggestion has been put forward by Good (1990), who examined the problems which arise in conversations where a speaker is required to supply detailed information to a listener in order to be understood. After observing individuals with schizophrenia, it was suggested they typically failed to recognise that another individual needed more information than was actually given in order to understand what was being said.

An investigation of non-verbal social deficits is provided by LaRusso (1978), who examined the sensitivity of paranoid patients to non-verbal cues, using video tapes showing people expecting to receive electric shocks or people simulating the same expectation. After asking subjects to say whether the people were expecting electric shocks or were pretending, the results suggest that while paranoid patients were more accurate in their decision about the genuine stimuli, normal controls were more accurate in their decisions concerning the simulated stimuli. LaRusso argues this finding is due to the paranoid patients being more sensitive to the genuine stimuli because of a processing bias and that the controls were more sensitive to simulated stimuli because they were more accepting of stereotypical social presentations.

Another example of the social difficulties experienced by individuals with schizophrenia is provided by Cutting & Murphy (1990), who compared patients with schizophrenia, manic psychosis and depression in ability to appreciate social knowledge. Using two sets of multiple choice questions (one testing the knowledge of how people tend to act in social situations and the other testing knowledge of non



social events or objects), it was found that individuals with schizophrenia performed poorly in the first questions compared to the other two groups. Cutting and Murphy suggest this reflects a social naiveté of individuals with schizophrenia. Two possible explanations for this were put forward, either that patients perform the task poorly because of limited experience and exposure to such situations, or that poor social judgements are an intrinsic feature of schizophrenia or at least of a subgroup of these patients.

Following these findings, two broad social cognitive models of schizophrenia symptomatology have been put forward. Both argue that attempts should be made to identify social cognitive abnormalities associated with particular symptom classes, on the assumption that the diverse range of symptoms exhibited by patients with schizophrenia are unlikely to be explicable in terms of common non social cognitive abnormalities. The first by Bentall (1990, 1994), suggests that the symptoms of hallucinations and delusions can be explained by a misattribution of their perception to an external source. The second by Frith (1992, 1994), suggests that schizophrenic symptoms can be explained by a general impairment in 'theory of mind', i.e. the ability to represent the mental states of others.

### **1.5 Theory Of Mind (ToM)**

First introduced by Premack & Woodruff (1978), ToM was used to describe an apparent deception behaviour in chimpanzees. Premack & Woodruff defined ToM as the ability to impute mental states to oneself and others. Extending this, it is thought human communication is based upon the assumption that others have minds just like ours and that it is necessary to have a ToM if we are to base our behaviour on what is

known about the beliefs and intentions of others (Frith, 1994). The evolutionary importance of ToM has been highlighted by Baron-Cohen (1996), who suggests the ability to mentalize has developed through natural selection of an ability which is advantageous within a social context.

A clue to the nature of this ToM mechanism is provided by early childhood autism. As a disorder, autism is thought to be characterised by a triad of impairments, including autistic aloneness, poor communication and lack of pretend play (Wing & Gould, 1979). It has been proposed that these impairments are due to a faulty ToM mechanism. As many individuals with autism have IQs within normal limits, it has been suggested their social impairments must be due to a deficit which is IQ independent (Frith, 1989). Baron-Cohen, Leslie & Frith (1985), suggest this deficit might be linked to problems in metarepresentational development. Using a model developed by Leslie (1987), they argue this mechanism is a crucial aspect of social skills, i.e. being able to conceive mental states and knowing that other people know, want, feel or believe in things - that is, having a ToM. It is thought that a ToM is also dependent upon having 'second order representation', i.e. the ability to appreciate that others have mental states which may be different from our own.

Comparing children with autism (with relatively high IQ's), with Down's syndrome and normal pre-schoolers, Baron-Cohen et al. (1985) found 80% of the children with autism performed poorly in a task designed to test whether they possess second order representation (Wimmer & Perner's, 1983, deception task and the Sally Ann Dolls test). From these findings, they suggest autistic children as a group fail to employ a

ToM, or more specifically have an inability to represent mental states. They suggest children with autism are unable to impute beliefs onto others.

Although autism and schizophrenia have traditionally been classified separately for diagnostic purposes, with the presence of positive symptoms ruling out the diagnosis of autism (DSM-IV, American Psychiatric Association, 1994), historically the term 'Autism' coined by Bleuler (1911) was used to describe a feature of schizophrenia. For example, paralleling autistic aloneness, communication difficulties and lack of pretend play, individuals with schizophrenia show social withdrawal, poverty of speech and stereotyped rather than spontaneous behaviour. In addition, the language difficulties found in both groups tend to involve pragmatics rather than syntax or semantics (Frith & Allen, 1988). In terms of cognitive test performances, similarities have been found in poor performance in 'frontal' tests rather than those localised to other brain sites (Shallice, Burgess & Frith, 1991).

Frith & Frith (1991) argue that the differences between autism and schizophrenia might be analogous to differences between early and late onset disorders. Consequently any similar underlying cognitive deficit which may manifest itself in different ways, would be consistent with different aetiologies in the two groups (Frith, 1994). A more direct relationship is suggested by Murray & Lewis (1992), who put forward a 'neurodevelopmental' subgroup of schizophrenia. This subgroup may have an early onset, together with a high proportion of males and defects in IQ, behaviour and sociability that can be traced back to early childhood. Supporting this, several case studies suggest some children with an initial diagnosis of infantile autism go on to develop adult schizophrenia (Petty, Ornitz, Michelman & Zimmerman, 1984).

## **1.6 ToM & Schizophrenia**

Frith (1992, 1994), suggests that the positive symptoms of schizophrenia such as hallucinations and delusions, are due to impairments in the ability to represent mental states. Frith argues that two discrete deficits relate to the nature of the delusion or hallucination expressed. Symptoms such as thought insertion and delusion of control (i.e. passivity phenomena) reflect impairments in the ability of an individual to represent their intentions to act (Frith & Done, 1989), whilst symptoms such as delusions of reference and persecution may reflect a difficulty in representing the mental states of other people, i.e. a deficit in the ability to mentalize or to have a ToM (Frith, 1994).

Frith suggests that a number of studies not explicitly couched in ToM terms, but which are dependant upon the mechanism support the ToM deficit account of schizophrenia symptoms. For example, Pilowsky & Bassett (1980), in a study of the way patients with schizophrenia describe pictures of other people, found that in contrast to controls without schizophrenia, they were more likely to use physical rather than mental state descriptions. Allen (1984), carried out a similar study in which patients with schizophrenia were asked to describe pictures of people. It was found that patients with poverty of speech failed to make inferences about these pictures, particularly in relation to the mental states of the people shown.

By definition, certain delusions may involve false inferences about the intentions of other people (Frith, 1994). Individuals with delusions of persecution infer that others have evil intentions towards them, whilst individuals with delusions of reference falsely infer that others are communicating with them. In addition, there are more

subtle consequences of having difficulties in inferring the mental states of others. Frith describes the situation where, under normal conditions, we have an immediate feeling of contact with others and that it is not particularly difficult to find out what is in their minds by a matter of direct perception. However, the question arises as to how one would behave when this ability to read others is absent? Within autism, this lack of the ability to read others is sometimes referred to as 'mind blindness' (Frith & Frith, 1991). Within the context of schizophrenia, this absence may be the basis of particular symptoms. Others may be seen as wooden and without real emotions (i.e. derealisation), or in extreme cases loved ones may be viewed as no longer having any real mental states, as though they had been replaced by robots (i.e. Capgras syndrome). Further, it could be that we can no longer read our own mental states and feel ourselves to be unreal (i.e. depersonalisation). Taking this further, if it is difficult to read other's intentions, we might believe that this was a deliberate ploy and that others were deliberately disguising their real intentions in order to gain some unknown advantage. This could be the basis for a paranoid belief in a general conspiracy and might particularly apply to those we knew well, as we would have gained some facility in reading their intentions.

Frith suggests a more severe consequence of a ToM deficit is a failure of 'decoupling'. This is the mechanism which allows an individual to represent propositions (e.g. "that Emma believes that 'it is snowing'"). Following Leslie's (1987), idea that a main requirement of such representations is a mechanism that decouples the content of the proposition (it is snowing) from reality, Frith argues that decoupling is a critical feature of such propositions because they are neither true or false and, therefore, fundamentally different from representations of reality. When a

decoupling process fails, Frith suggests the content of the proposition (such as it is snowing) becomes separated from the rest of the proposition (such as Emma believes that....) and that the content is then perceived as a representation of reality rather than another's belief. Consequently, as reality and beliefs do not always coincide, this could potentially be very confusing, resulting in 'free floating' representations. Frith suggests this may explain the cause of third person hallucinations in schizophrenia, with the precise nature of the experience being determined by the proposition from which it became detached.

In addition to free floating representations, Frith suggests that a failure in the decoupling mechanism will lead to an inability to represent either their own or another's mental state. Within this context, Frith (1987) argues that patients with passivity experiences (e.g. with delusions of control and thought insertion) have a defect in central monitoring. This central monitoring is thought to be dependent on being aware of an intention to make a particular response before it is actually made. Without central monitoring, responses and intentions will be assessed by peripheral feedback. Frith gives the example that if we were unable to monitor our own intentions with regard to speech, we would not know what we were going to say until after we had said it. Frith (1994) argues that this failure in central monitoring is due to an inability to monitor one's own mental states and intentions. However, this lost ability to represent mental states, and associated loss of awareness, is not an 'all or nothing' process, but may be based upon a continuum of difficulty underlying the representations. Frith suggests that this continuum can be observed in studies which have examined the development of the ability to represent mental states in children. Specifically, Frith suggests that the development of a 'representational mind' is

closely related to the development of an awareness of mental states. The development of the awareness of our own mental states and those of others may therefore depend on our ability to represent these states.

After reviewing the developmental literature, Frith suggests that progress towards a ToM can be associated with three distinct stages, which are an awareness of our goals an awareness of our own intentions and of other mental states, and an awareness of other people's mental states. These stages are associated with different classes of schizophrenic signs and symptoms as seen in Table 1.

**Table 1. Abnormalities Of Awareness At Various Levels And Some Associated Signs And Symptoms Of Schizophrenia (Taken From Frith, 1994, p.156)**

Loss of Awareness Of.....	Positive Features	Negative Features
Own Goals	Grandiose Ability	Depersonalisation, Lack Of Will
Own Intentions	Delusions Of Control, Thought Insertion	Poverty Of Thought, Loss Of Affect
Other's Intentions	Delusions Of Persecution, Third Person Hallucination	De-realisation, Social Withdrawal

### **1.7 Studies Of ToM Schizophrenia**

Although the social deficits of individuals with schizophrenia are interpreted as being consistent with the concept of a ToM deficit account, to date there have only been two published investigations directly assessing ToM in schizophrenia.

The first investigation, by Corcoran, Mercer & Frith (1995), devised a simple social inference task to examine an individual's ability to comprehend indirect speech. This involved giving a 'hinting task' to assess an individual's ability to infer the real

intentions behind indirect speech. It comprised ten short passages presenting an interaction between two characters and all ending with a character dropping a very obvious hint. After each story, the question asked was, what did the character really mean after saying.....? All stories were read aloud to individuals so that appropriate prosodic information was included. Given the problems in prose recall typically found in schizophrenia (e.g. Shallice, Burgess & Frith, 1991), stories were repeated to those individuals who wished so.

Comparing six groups of in-patients with schizophrenia (those with either negative features, incoherence, paranoid symptoms, or passivity experiences; those with other symptoms such as expansive and musical hallucinations; and those in remission), with control subjects (other psychiatric and 'normal' individuals), it was found that specific symptom subgroups of schizophrenia performed poorly in the hinting task compared to controls. Consistent with Frith's (1992) model, a hierarchy of expressed severity appeared to be present, with problems in the hinting task being present in patients with negative symptoms and related positive features (including incoherent speech). Patients with passivity experiences and those in remission showed no problems in the hinting task. This is interpreted by Corcoran et al. (1995) as support for the argument that there are symptom specific difficulties in the ability to infer what is going on in the minds of other people. Because those patients with passivity experiences were able to solve the hinting task it suggests the ability to monitor their own intentions to act and the ability to monitor those of others are independent of each other. Furthermore, as those patients in remission solved the hinting task it suggests the ability to mentalize may be a state rather than a trait variable and is closely associated to symptomatology.



In terms of overall group differences, a greater level of impairment was found in those individuals with schizophrenia compared to controls. However, a problem with this finding is that the two groups were not matched in their current level of intellectual functioning. Corcoran et al. (1995) suggest this is not likely to be important as any IQ difference could not account for the difference in the performance of the hinting task. Although they do not explicitly describe how, Corcoran et al. suggest that the two groups are performing the task differently. They highlight the correlation between performances in the hinting task and estimated IQ in the respective groups. Within the control group the correlation between estimated IQ and hinting task performance is zero, and the same was true with individuals with schizophrenia. They suggest that this implies individuals with schizophrenia may rely on a generalised intellectual ability independent of IQ.

The second study investigating ToM in schizophrenia was conducted by Frith & Corcoran (1996). Using a ToM task consisting of six short stories, the mentalizing ability of four subgroups of individuals with schizophrenia (those with either behavioural signs, paranoid symptoms, passivity phenomena or in remission) were compared with a group of non symptomatic controls. Based upon those developed by Happé (1994), the stories examine the ability of individuals to appreciate first and second order false belief and deception. In a first order story, one character has a false belief about the state of the world, whilst in a second order story, one character has a false belief about the belief of another character. Following each story, participants were asked two questions. The first was dependent upon the ability of the participant to infer the mental state of one of the characters in the story (i.e. a ToM question) and reflected that character's false belief about the situation. The second was targeted at

the participant's comprehension of the story and understanding of the reality of the situation. This question could be answered independently of any mentalizing abilities and provided a measure of how well participants had remembered each story.

Results suggested that patients with paranoid delusions and behavioural signs, compared to the other groups, had difficulty in solving the ToM questions for both first and second order stories. This confirms the results obtained by Corcoran et al. (1995). In addition, the result is likely to be independent of any general cognitive disability as there was no significant difference in IQ between the patients with paranoid delusions, symptoms of passivity or those in remission. There was also nothing to suggest that IQ influenced the performance of the control group.

However, in terms of the relationship with memory, the interpretation of these findings is not clear. As patients with paranoid delusions and behavioural signs also had problems in the reality questions, their ToM performance is difficult to make sense of. This means that the direction of causality is uncertain, as the problem with mentalizing may cause the memory problem or vice versa. For example, it may be that the stories used (particularly second order) may present some patients with too great a memory load.

Frith & Corcoran suggest that it is interesting that the patients with passivity symptoms (delusions of control and thought insertion, etc.) could answer the ToM questions. This is consistent with the results obtained by Corcoran et al. (1995), however, Mlakar, Jensterle & Frith (1994) found that patients with passivity experiences typically have problems with representing their own mental states. This

suggests that the problem with representing their own mental states may not generalise to inferring the mental states of others. In terms of the patients in remission, because they also answered both the reality and ToM questions without any problems, it suggests that the underlying cognitive deficit may fluctuate with symptoms and therefore is a state rather than a trait variable.

In terms of the relationship with other cognitive skills, Frith & Corcoran suggest that the ToM deficit, although remaining to be confirmed as independent, is likely to be distinct from other cognitive difficulties. To date, the relationship between ToM and other cognitive skills, such as more specific measures of memory and executive functioning, remain to be clearly established. This would appear to be particularly important given the well established problems in general intellectual functioning, memory, organisation and planning present among the symptom subgroups of schizophrenia.

### **1.8 ToM In Forensic Patients**

The presence of a ToM deficit may be particularly important in forensic patients. It is suggested that the ability to empathise with another is dependent on the ability to represent their mental states (Frith, 1989). Indeed, representations of the internal world of another may act as stimuli for the activation of an affective empathic response (Bateson, Fultz & Schoenrade, 1987). A ToM deficit may therefore lead to a lack of empathy

Several clinical descriptions suggest that individuals with psychopathy lack the ability to empathise with another's distress (e.g. Hare, 1991). Although there is no consensus

of findings, this clinical description is supported by studies demonstrating that psychopaths fail to produce any physiological or affective responses to either actors modelling distress reactions or to pictures of individuals in distress (e.g. Aniskiewicz, 1979).

A recent empirical investigation of ToM in psychopathy is provided by Blair, Sellars, Strickland, Clark, Williams, Smith & Jones (1996). Using Happé's (1994) advanced test of ToM, a comparison was made between male Special Hospital patients rated as having psychopathic personality disorder and incarcerated non psychopathic controls defined using a Psychopathy Checklist-Revised (PCL-R, Hare, 1991). No significant differences in ToM were found between the groups and it was suggested that the psychopath's deficit in their ability to empathise is not likely to be due to a ToM deficit.

To date, there has not been any investigation of ToM in a forensic sample of individuals with schizophrenia. This would appear to be particularly important as they represent a significant proportion of forensic patients (Modestin & Ammann, 1996). Among violent and psychotic men, there is also evidence to suggest that delusions and, in particular, delusions of a paranoid nature, are common precipitants for offending (Taylor, 1985). If Frith's account of a ToM deficit being present in particular symptom subgroups of schizophrenia is correct, it may have important implications for understanding and treating this patient group. This question is highlighted further by the inconsistency of findings regarding the relationship between cognitive performance and history of violence in schizophrenia. Because a ToM deficit has been found within a non forensic sample of patients with

schizophrenia, it would be interesting to examine if similar deficits are present within a forensic sample.

### **1.9 Present Study & Hypotheses**

Frith's account of ToM deficits in particular symptom subgroups of schizophrenia represents a new and exciting area of investigation. However, given its relatively new formulation as a theory and that there have been only two direct empirical investigations, there remain several unanswered questions. These include whether the initial findings can be replicated in other populations of individuals with schizophrenia and the relationship of ToM with other 'non social' dimensions of cognition. As suggested, the presence of a ToM deficit in patients with schizophrenia may be particularly important within a forensic context, with the ability to empathise with another being dependent on the ability to represent their mental state (i.e. having a ToM). The potential to understand offending behaviour and develop new interventions may also arise.

The aim of the current investigation is to more closely examine within a forensic context (i.e. a Special Hospital), Frith's account of ToM deficit in schizophrenia. Using a similar methodology to that employed by Frith & Corcoran (1996), patients with schizophrenia will be subdivided according to their symptom profile. Different symptom profiles will then be compared with each other and a personality disorder control group.

The experimental group selected includes patients with a DSM - IV (1994) diagnosis of schizophrenia and who can be divided into one of three groups. These groupings

are of those with either predominantly behavioural signs, passivity phenomena or paranoid delusions as their main symptoms. No 'in remission' patients were included in the investigation, as such individuals would no longer be detained in a Special Hospital. All patients have also been previously classified as 'treatment resistant' (TRS), meaning that they have been unresponsive to neuroleptic medication. It is hypothesised that these patients represent an important population to examine, if the ToM deficit account of schizophrenia is correct. The control group selected represents another forensic patient population with a DSM - IV (1994) diagnosis of personality disorder (PD). The rationale for selecting this group was guided by the findings of the previously described investigation by Blair et al. (1996) which suggested that a ToM deficit is not present in this patient population.

In addition to the between group comparison of patients, a within group comparison will be made of the relationship between an individual's ToM performance and previously obtained profiles of neuropsychological test scores. These include Wechsler Adult Intelligence Scale Revised (WAIS-R), Wechsler Memory Scale - Revised (WMS-R) scores and tasks designed to examine perceptual organisation, planning and visual memory, and capacity to sort and shift concepts. These include the Rey-Osterrieth Complex Figure Test (CFT) and Classical Weigl, respectively. Recently, such tasks have been thought to be associated with higher executive functioning and predominantly located within the frontal lobes (e.g. Lezak, 1995). As highlighted, the relationship between ToM, general intellectual functioning, memory, organisation and concept formation skills remains to be fully examined.

To summarise, the aims of the investigation will be:

1. To examine the ToM performance of a forensic sample of patients diagnosed with schizophrenia (and classified as 'treatment resistant') subdivided into one of three symptom groups of either predominantly behavioural signs, passivity phenomena or paranoid delusions and to compare them with each other and a Personality Disorder control group.

**Hypothesis (1H<sub>1</sub>)** - That patients with schizophrenia will perform significantly less well than the PD control group in the ToM task (both first order, i.e. the ability to appreciate that others may have a false belief about the state of the world, and second order, i.e. the ability to appreciate that another may have a false belief about the mental state of another) and that those patients with either predominantly paranoid delusions or behavioural signs will be more impaired than those with predominantly passivity symptoms.

**Null Hypothesis (1H<sub>0</sub>)** - That patients with schizophrenia will not perform significantly differently from the PD control group in the ToM task (both first and second order) and that the three symptom subgroups of schizophrenia will not differ in ToM performance.

2. To compare performance on the ToM task with performances on a range of neuropsychological tests, including WAIS-R, WMS-R, Rey-Osterrieth CFT and Classical Weigl.

**Hypothesis (2H<sub>1</sub>)** - That performance in the ToM task will be unrelated to or independent of performance in any of the neuropsychological tests.

**Null Hypothesis (2H<sub>0</sub>)** - That performance in the ToM task will be related to performance in either one of the neuropsychological tests.



## **2. Method**

### **2.1 Design**

In the first part of the study, an independent groups design is used to compare the performance of a forensic 'Treatment Resistant' Schizophrenia (TRS) sample and a Personality Disorder (PD) control group in a test of ToM.

The independent variables are the respective groups including the PD controls and TRS sample. The TRS sample is sub-divided into those with either predominantly behavioural signs, passivity phenomena or paranoid delusions as their main symptoms.

The dependent variables include the performance in a test of ToM.

In the second part of the study, a within groups design is used to compare the total group's ToM test performance and their performance in neuropsychological tests including the Wechsler Adult Intelligence Scale - Revised (WAIS-R), Wechsler Memory Scale - Revised (WMS-R), the Rey-Osterreith Complex Figure Test (CFT) and Classical Weigl.

### **2.2 Participants**

In total 60 participants took part in the study. As a forensic sample, at the time of testing all participants were patients in one of England's three Special Hospitals and detained under sections 37 / 41<sup>1</sup> of the Mental Health Act (1983). Only male patients were selected and those with English as a first language.

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<sup>1</sup> 37 Power to make a hospital or guardianship order, 41 Restriction order.

### **i. 'Treatment Resistant Schizophrenia' Sample (TRS)**

37 patients (61.6% of total) meeting the criteria for a Diagnostic and Statistical Manual for Mental Disorders, American Psychiatric Association, (DSM-IV 1994) diagnosis of schizophrenia took part used in the study. These patients were selected from an ongoing research programme of 'Treatment Resistant Schizophrenia' within the hospital. They have, to date, been unresponsive to any neuroleptic medication and have been detained for a number of years. Using a Symptom Rating Checklist described later, these patients were assigned into one of three groups, those with either predominantly behavioural signs (N= 12 - 20%), passivity phenomena (N= 11 - 18.3%) or paranoid delusions (N= 14 - 23.3%).

### **ii. Personality Disorder Controls (PD)**

23 (38.3% of total) PD patients within the hospital were used as controls. They all had a DSM-IV (1994) diagnosis of psychopathic personality disorder and no history of a psychotic illness.

## **2.3 Measures**

### **i. ToM Task**

Six stories were used to assess ToM. Developed and used by Frith & Corcoran (1996), these provide a brief examination of an individual's ability to appreciate first and second order false belief and deception. In the first order stories a character has a false belief about the state of the world. In the second order stories a character has a false belief about the belief of another character. Both sets of stories describe naturalistic social situations and require either the interpretation of a story character's behaviour, i.e. what they have said or a prediction of how they would act. The stories are presented in Appendix i.

After each story was read out to the participant, two questions were asked. These are also presented in Appendix i. The first question was aimed at the individual's understanding of the mental state of a central character in the story, i.e. the ToM question. The second question was targeted at the individual's comprehension of the story. Based on the reality of the situation, this question could be answered without any mentalizing abilities. As such, this question also served as a measure of how well the individual had remembered the story.

The scoring procedure for both questions followed that described by Frith & Cocoran (1996). For the first and second order ToM and memory questions, the participant was given either a pass or a fail. The criteria for a correct answer in the ToM question is based upon the content of the response, i.e. an ability to appreciate the mental state of one of the characters in the story and that character's false belief about the situation. The criteria for a correct answer in the reality / memory question is based on the correct recall of a target piece of information from the story.

Percentage of correctly answered questions was calculated separately for first order ToM and for associated memory questions and for second order ToM and associated memory questions.

## **ii. Symptom Rating Checklist (SRC)**

The construction, administration and scoring of this measure was carried out in co-operation with a senior research psychiatrist on the TRS project. As a custom made measure it was intended to provide a brief assessment of the presence of behavioural signs, passivity phenomena and paranoid delusions in schizophrenia. It consists of a total of 15 items and

three sections designed to match the symptom subgroups used in the current study. The individual items are taken from: The Scale for the Assessment of Negative Symptoms (SANS: Andreason, 1989); The Comprehensive Psychiatric Rating Scale (CPRS: Asberg, Perris, Schalling & Sedvall, 1978); and The Brief Psychiatric Rating Scale (BPRS: Overall & Gorham, 1962). The completed measure is presented in Appendix ii.

Items within the measure required scores based on observation and on direct questioning by the interviewer. An individual's final score on the measure was calculated by converting their total score in each of the three symptom subgroup sections of the SRC to three respective percentage scores. An individual was assigned to a symptom subgroup based on the highest score in each of the three symptom subgroups. The criteria for each symptom subgroup is given in the SRC.

In order to establish the inter-rater reliability of the measure, twelve interviews were conducted with another independent rater present who had been trained in the administration and scoring of the measure. Data presented in the Results section suggest the SRC has an acceptable level of inter-rater reliability.

### **iii. Neuropsychological Tests**

Each participant had previously completed a battery of conventional psychometric tests. These had been administered by a member of the permanent hospital clinical staff over the preceding one and a half years. A selection of tests were used in the present analysis including, the Wechsler Adult Intelligence Scale - Revised (WAIS-R), the Wechsler Memory Scale - Revised (WMS-R), the Rey-Osterrieth Complex Figure Test (CFT) and the Classical Weigl.

### **WAIS-R Full Scale IQ - (Wechsler, 1986)**

This was calculated from the sum of all the individual subtest scaled scores (or their prorated values if fewer than the eleven subtests were administered) and following the directions outlined in the manual (Wechsler, 1986). Although there is scepticism regarding the usefulness of averaging the performance of the subtests (e.g. Kaufman, 1990), the full scale IQ is thought to represent a general measure of intellectual functioning with age related norms. It has also been found to be an excellent predictor of academic achievement (Lezak, 1988). The validity and reliability of the test has been well established and described in texts such as Lezak (p. 699, 1995).

### **WMS-R - (Wechsler, 1988)**

Four of the nine Wechsler memory subtests were included in the current analysis. These were, immediate memory for a complex story, delayed recall of the same story, immediate memory of four geometrical designs and delayed recall of the same designs. The administration and scoring of the test was carried out following the instructions outlined in the manual (Wechsler, 1988). The overall test has well established reliability and validity and is described in texts such as Lezak (1995).

### **CFT - (Rey, 1941, Osterrieth, 1944)**

This is a test which allows the assessment of a variety of cognitive processes, including planning, organisational skills and problem solving strategies, as well as perceptual, motor and memory functions. Overall, the test has well established validity and reliability, which has been well described in texts such as that by Lezak (1995). The test's procedure involves having the subject first copy the figure using coloured pencils on blank pieces of paper and then, without warning, being asked to reproduce it after a time delay (here approximately 30

minutes). This produces a copy and recall sequence score. Both are scored in the same manner, so the degree of organisation can be compared in each. The scoring criteria for both copy and recall are determined as follows;

1. Central rectangle - subject begins by drawing large central rectangle and details are added in relation to this.
2. Detail rectangle - subject begins with a detail attached to the central rectangle, completes the rectangle and adds remaining details in relation to this.
3. Perimeter - subject begins by drawing the overall contour of the figure without explicit differentiation of the central rectangle and then adds internal details.
4. Piecemeal, good result - subject juxtaposes details one by one, without an organising structure.
5. Piecemeal, poor result - subject copies discrete parts of the drawing, without any semblance of organisation.
6. Substitute - subject substitutes the drawing of a similar object, such as a boat or house.
7. Scrawl - Unrecognisable.

### **Classical Weigl (Weigl, 1941)**

The Classical Weigl or Colour Form Sorting Test is used to measure an individual's capacity to shift thinking from one concept to another, while providing a minimum of directive feedback which is only gradually provided after a sequence of failures. The validity and reliability of the task is well established and described in more detail in texts such as Lezak, (1995). The task consists of twelve tokens, four coloured red, four coloured blue, and four coloured green and yellow. These are also subdivided into four squares, four circles and four triangles. The aim of the task is to use first one sorting criterion and then the other. The scoring criteria use one of six ratings. These include:

1. Superior pass - one in which the two main sorts are achieved easily and with minimum of instruction, and in which there is no 'sequencing' in either sort. Sequencing involves the intrusion of one sort into the other, i.e. sorting by colour in which piles are invariably sequenced by shape or vice versa.
2. Pass - an ordinary pass is one which is achieved with little or no prompting, but there may be a sequencing intrusion in either one or both sorts.
3. Equivocal pass - a marginal pass which occurs when the two main sorts are accompanied by an interim sort, using design, e.g. piles & shape followed by design & colour & shape, but corrected to piles & colour on the instruction of piles.
4. Equivocal fail - a more hesitant version of 3., where there may be two intermediary designs, or some perplexity before achieving the desired second sort.
5. Fail - occurs when it has finally become necessary to give a direct instruction to use the second criterion, i.e. "how about colour (or shape)?" If this is followed by an adequate sort in which there is no sequencing, the score is 5.
6. Contaminated fail - when failure is also accompanied by a sequencing intrusion of the first sort, then this is a contaminated fail. It is also used for patients who completely fail the task, i.e. fail to achieve a second sort, perhaps because of perseveration. However, it is not used for those who refuse or fail to complete the task.

## **2.4 Procedure**

### **i. Ethical Approval**

After completing a formal application, permission to conduct the project was obtained from the Special Hospital Research and Ethics committee. Written confirmation of this is presented in Appendix iii.

## **ii. Participant Consent**

Following the identification of potential participants (both TRS and PD Controls), their Responsible Medical Officers (RMOs) and clinical teams were formally asked if they had any objections to individuals being approached to take part in the project. The letter requesting permission from the RMO to approach individual patients is presented in Appendix iv. Once RMO consent was obtained, individual patients were approached and asked if they would be prepared to participate in the project. The introduction of the project was by an initial verbal description followed by a written outline and patient consent form. This is presented in Appendix v.

## **iii. Research Interview**

In total, this lasted approximately 40 minutes. Once individual consent had been obtained, a brief outline of the interview was given. This was followed by the completion of the ToM task or SRC. To reduce the risk of order effects, the presentation of measures was counterbalanced, with half of the participants receiving the ToM task first followed by the SRC, and half of the participants receiving the SRC first followed by the ToM task. For the ToM stories, if a participant wanted a story to be repeated, this was done only once.



### 3. Results

Data analysis was completed using the Statistical Package for Social Scientists (SPSS) for Windows. The rationale for the choice of statistical analysis was guided by professional statistical advice and the criteria for parametric and non parametric tests.

#### 3.1 Demographic Information

Demographic details for the groups are presented in Table 1. For each group this includes the mean and standard deviation for age, number of years detained in the Special Hospital, age at first psychiatric diagnosis, duration of illness, educational qualifications and WAIS-R full scale IQ.

**Table 1. Demographic Details Of Groups**

Group	Mean Age In Years (SD)	Mean Years Detained In Special Hospital (SD)	Mean Age At First Psychiatric Diagnosis (SD)	Mean Years Duration Of Illness (SD)	Educational Qualifications*					WAIS-R Full Scale IQ (SD)
					0	1	2	3	4	
1. Behavioural Signs (N=12)	41 (6.73) Range 29-51	10.5 (4.90) Range 5-17	23.5 (5.51) Range 18-35	17.16 (5.16) Range 10-27	9	2	0	1	0	N=11 82.45 (9.16)
2. Passivity Phenomena (N=11)	44 (13.07) Range 30-68	12.8 (7.88) Range 5-29	26.45 (9.73) Range 17-51	15.90 (6.36) Range 6-25	8	2	0	0	1	N=10 97.00 (14.44)
3. Paranoid Delusions (N=14)	42 (7.87) Range 31-58	8.78 (4.17) Range 2-15	26.7 (8.04) Range 18-48	17.0 (7.64) Range 7-34	10	2	1	1	0	N=13 86.69 (13.85)
4. PD Controls (N=23)	34 (8.38) Range 20-50	4.6 (1.94) Range 1-8	25.78 (6.29) Range 18-38	8.65 (5.82) Range 2-30	15	7	0	0	1	N=23 96.08 (18.02)

\*Educational Qualifications Key: 0 = None; 1 = 'O' levels / C.S.E; 2 = 'A' level; 3 = Diploma; 4 = Degree

Small sample sizes in each group and lack of homogeneity of variance among the data suggested that non parametric Kruskal-Wallis one way analysis of variance (ANOVA) tests were appropriate to examine differences between the four groups in age, number of years detained in the Special Hospital, age of first psychiatric diagnosis, duration of illness and WAIS-R full Scale IQ. A summary of these results is presented in Table 2.

**Table 2. Summary Table To Show Kruskal-Wallis One Way ANOVA Test Results For Demographic Details Between Groups**

Demographic Variable	Kruskal-Wallis Value (H)	d.f.
Age	10.33*	3
Number Of Years Detained	20.62**	3
Age Of First Psychiatric Diagnosis	1.40	3
Duration of Illness	22.21**	3
WAIS-R Full Scale IQ (N=57)	9.55*	3

\* Significant at  $p < .05$ , \*\* Significant at  $p < .01$

### **i. Age Of Participants**

Analysis indicated a significant difference between the four groups in their age. The three TRS symptom subgroups had mean ages in the early 40s and the PD controls had a mean age in the early 30s. Six Mann-Whitney U tests suggested that the differences were located between each of the TRS symptom subgroups and the PD controls. However, caution is required in the interpretation of these tests, as multiple comparisons increase the chance of a significant result. A summary of these Mann-Whitney U test results is presented in Table 3:

**Table 3. Mann-Whitney U Tests Between Groups In Age**

Comparisons	N	U Value	Z Score Corrected For Ties
Behavioural Signs & Passivity Phenomena	23	62.5	-0.22
Behavioural Signs & Paranoid Delusions	26	76.0	-0.41
Behavioural Signs & PD Controls	35	74.5	-2.21*
Passivity Phenomena & Paranoid Delusions	25	72.5	-0.25
Passivity Phenomena & PD Controls	34	24.5	-2.19*
Paranoid Delusions & PD Controls	37	74.5	-2.71*

\* Significant at  $p < .05$

### **ii. Number Of Years Detained In Special Hospital**

Analysis indicated a significant difference between groups in the number of years detained in the Special Hospital (see Table 2.). Although caution is needed in the interpretation of the results, six Mann-Whitney U tests suggested that the differences were located between each of the three TRS symptom subgroups and the PD controls.

Table 1. shows that the three TRS symptom subgroups had mean years of detainment in the 10 year range, whilst the PD controls had a mean of just under 5 years. A summary of the Mann-Whitney U test results is presented in Table 4.

**Table 4. Mann-Whitney U Tests Between Groups In Number Of Years Detained In Special Hospital**

Comparisons	N	U Value	Z Score Corrected For Ties
Behavioural Signs & Passivity Phenomena	23	59.0	-0.43
Behavioural Signs & Paranoid Delusions	26	64.5	-1.1
Behavioural Signs & PD Controls	35	44.0	-3.32**
Passivity Phenomena & Paranoid Delusions	25	56.5	-1.12
Passivity Phenomena & PD Controls	34	24.5	-3.79**
Paranoid Delusions & PD Controls	37	71.0	-2.85**

\*\* Significant at  $p < .01$

### iii. Age At First Psychiatric Diagnosis

Analysis did not suggest a significant difference between groups in the age at which a psychiatric diagnosis was first given. Means for each group, presented in Table 1., show that all four groups share a similar mean age of first psychiatric diagnosis (within their mid 20s).

### iv. Duration Of Illness

Analysis indicated a significant difference between groups in the duration of illness. With appropriate caution, because of the problems associated with multiple comparisons, six Mann-Whitney U tests suggested that these differences were located between the three TRS symptom subgroups and the PD controls. Table 1. shows that each of the three TRS symptom subgroups had mean duration of illness of around fifteen years, whilst the PD control group had a mean duration of illness of just under nine years. The results of the Mann-Whitney U tests are presented in Table 5.

**Table 5. Mann-Whitney U Tests Between Groups In Duration Of Illness**

Comparison	N	U Value	Z Score Corrected For Ties
Behavioural Signs & Passivity Phenomena	23	56.5	-0.43
Behavioural Signs & Paranoid Delusions	26	66.5	-0.33
Behavioural Signs & PD Controls	35	103.5	-3.87**
Passivity Phenomena & Paranoid Delusions	25	73.0	-0.22
Passivity Phenomena & PD Controls	34	121.0	-3.06**
Paranoid Delusions & PD Controls	37	155.0	-3.57**

\*\* Significant at  $p < .01$

#### v. Educational Qualifications

Small expected frequencies in each cell (less than 5) prevented a valid chi-square analysis of the educational qualifications categories by group as presented in Table 1. Although not a perfect solution, as expected frequencies continue to be low, when the educational qualification categories were combined into those with and those without any formal educational qualifications, a  $4 \times 2$  chi-square analysis indicated a non significant association between group and educational qualifications ( $\chi^2 = 0.45$ , d.f. = 3, n.s.). The contingency table to accompany this analysis is presented in Table 6. This shows that the majority of participants were without formal educational qualifications (70%), with the remaining distribution of those with qualifications (30%) being relatively evenly spread across groups. However, there also appeared to be a slight trend for the PD controls to have educational qualifications.

**Table 6. Contingency Table Between Combined Distribution Of Educational Qualifications & Groups**

		Group				
Educational Qualification		Behavioural Signs	Passivity Phenomena	Paranoid Delusions	PD Controls	Row Total
	Nothing	9 (15%)	8 (12.3%)	10 (16.7%)	15 (25%)	42 (70%)
	Have Qualifications	3 (5%)	3 (5%)	5 (8.3%)	8 (13.3%)	18 (30%)
	Column Total	12 (20%)	11 (18.3%)	14 (23.3%)	23 (38.3%)	60 (100%)

## vi. WAIS-R Full Scale IQ

Analysis indicated a significant difference between groups in WAIS-R Full Scale IQ. Despite the problems of multiple comparisons, six Mann-Whitney U tests suggested significant differences between the behavioural signs symptom subgroup and both the passivity phenomena symptom subgroup and the PD controls. The results of these Mann-Whitney U tests are presented in Table 7. In Table 1., it can be seen that the mean WAIS-R full scale IQ for the behavioural signs symptom subgroup was in the low 80s, the paranoid delusion symptom subgroup in the mid 80s, while both the passivity phenomena symptom subgroup mean and the PD controls mean lies in the high 90s.

**Table 7. Mann-Whitney U Test Between Groups In WAIS-R Full Scale IQ**

Comparisons	N	U Value	Z Score Corrected For Ties
Behavioural Signs & Passivity Phenomena	23	18.5	-2.58**
Behavioural Signs & Paranoid Delusions	26	62.0	-0.55
Behavioural Signs & PD Controls	35	52.5	-2.73**
Passivity Phenomena & Paranoid Delusions	25	40.0	-1.55
Passivity Phenomena & PD Controls	34	103.5	-0.45
Paranoid Delusions & PD Controls	37	104.5	-1.48

\*\* Significant at  $p < .01$

## 3.2 Inter-Rater Reliability Of SRC

The inter-rater reliability of the SRC was assessed using the ratings of 12 participants. Analysis revealed that 10 of these were given the same rating by the independent raters and that the overall level of agreement based on all 12 ratings was 83.3%. More detailed examination of both the patients where there was disagreement in symptom ratings revealed the first rater believed behavioural signs were the most predominant, whilst the second rater considered paranoid symptoms to be most predominant. An examination of inter judge agreement in these 12 ratings using Cohen's Kappa

revealed a reliability of  $K = .77$ . This was interpreted as representing a good level of agreement between the 2 independent raters. The contingency table for this analysis is presented in Table 8.

**Table 8. Contingency Table To Show The Level Of Inter-Rater Agreement For Assigning Twelve Participants Into One Of The Four Groups Using SRC**

		Rater 1				
Rater 2		Behavioural Signs	Passivity Phenomena	Paranoid Delusions	PD Controls	Total Rating
	Behavioural Signs	2	1	1	0	4
	Passivity Phenomena	0	1	0	0	1
	Paranoid Delusions	0	0	2	0	2
	PD Controls	0	0	0	5	5
	Total Rating	2	2	3	5	12

### **3.3 Symptom Profiles & ToM Performance**

The normality of the data was assessed using Kolmogorov-Smirnov Goodness of Fit tests. These were performed on each of the three TRS symptom subgroups and the PD controls for each of the story question sections, i.e. first order reality questions, first order ToM questions, second order reality questions and second order ToM questions. The results of these analyses are presented in Table 9. These analyses indicated that there was not a completely normal distribution of scores for all groups in each of the question categories. A non parametric Kruskal-Wallis one way ANOVA was therefore considered the most appropriate method of analysis.

**Table 9. Kolmogorov-Smirnov Goodness of Fit Tests For Each Group In Each Category Of ToM Task**

Question Category	Mean (SD)	Z Value
<b>Behavioural Signs</b>		
First Order Reality	100 (0.00)	No variance
First Order ToM	91.66 (28.86)	1.83**
Second Order Reality	97.21 (9.64)	1.84**
Second Order ToM	27.75 (23.90)	0.89
<b>Passivity Phenomena</b>		
First Order Reality	100 (0.00)	No variance
First Order ToM	100 (0.00)	No variance
Second Order Reality	96.96 (10.07)	1.75*
Second Order ToM	57.52 (21.55)	0.99
<b>Paranoid Delusions</b>		
First Order Reality	100 (0.00)	No variance
First Order ToM	97.61 (8.92)	1.99**
Second Order Reality	85.67 (21.58)	1.46*
Second Order ToM	40.42 (32.47)	1.12
<b>PD Controls</b>		
First Order Reality	100 (0.00)	No variance
First Order ToM	100 (0.00)	No variance
Second Order Reality	92.74	2.29**
Second Order ToM	86.93 (19.46)	1.92**

\* Significant at  $p < .05$ , \*\* Significant at  $p < .01$

**i. First Order Reality Questions**

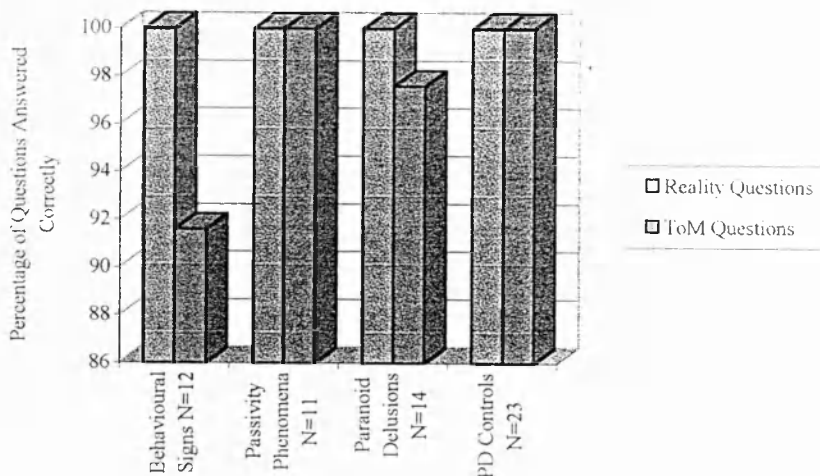
All 60 participants answered the first order reality questions correctly, with no variation between groups in responses. Therefore, no statistical analysis was performed. Mean percentages of questions answered correctly by each group are presented in Figure 1.

**ii. First Order ToM Questions**

Examining the responses to the ToM questions for the first order stories indicated that all members of the passivity phenomena symptom subgroup, as well as all the PD controls, obtained 100% correct answers. However, one member of the behavioural signs symptom subgroup and one member of the paranoid delusion symptom subgroup failed to obtain 100% correct answers (0 % and 66.6% correct respectively). Analysis using a Kruskal-Wallis one way ANOVA failed to find any significant

differences between groups ( $H = 2.7$ , d.f. = 3, n.s.). This supports the null hypothesis ( $1H_0$ ) which predicted a non significant difference between each of the three TRS symptom subgroups and the PD controls in first order ToM performance. Figure 1. illustrates the mean percentage of first order ToM questions answered correctly by each group. Although the differences are non significant, it can be seen in Figure 1. that the behavioural signs symptom subgroup was the most impaired, with a mean of 91.7 % (SD 28.9), followed by the paranoid delusion symptom subgroup, with a mean of 97.6 % (SD 8.9). There were no differences between the passivity phenomena symptom subgroup and the PD controls. Both these groups had means of 100 % (SD 0).

**Figure 1. Mean Percentage Of First Order Reality & ToM Questions Answered Correctly By The Four Groups**



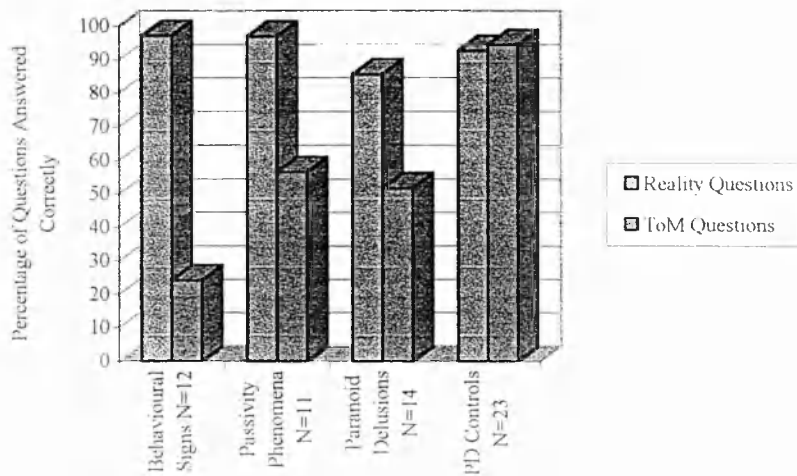
### iii. Second Order Reality Questions

A Kruskal-Wallis one way ANOVA failed to find any significant between group differences in the percentage of second order reality questions passed ( $H = 4.48$ , d.f. = 3, n.s.) Figure 2. illustrates the mean percentage of reality questions answered



correctly by each group. It can be seen in Figure 2., that the mean percentage of reality questions answered correctly by each group was above 80 in all cases.

**Figure 2. Mean Percentage Of Second Order Reality & ToM Questions Answered Correctly By The Four Groups**



#### iv. Second Order ToM Questions

To control for the influence of memory on ToM performance, an analysis was carried out using only those participants who had passed all second order reality questions, i.e. with 100% scores. This produced a total sample of 48, with 11 in the behavioural signs subgroup, 10 in the passivity phenomena subgroup, 9 in the paranoid delusions subgroup and 18 in the PD controls. A Kruskal-Wallis one way ANOVA using these groups indicated a significant difference between groups in second order ToM performance ( $H = 30.87$ , d.f. = 3,  $p < .01$ , corrected for ties). The mean percentages of second order ToM questions answered correctly by each of the three TRS symptom subgroups and PD controls is illustrated in Figure 2. The behavioural signs symptom subgroup was the most impaired in the second order ToM questions, with a mean of 24.2% (SD 21.5) of questions answered correctly, followed by the paranoid delusions and passivity phenomena symptom subgroups, with means of 51.8% (SD 29.4) and 56.6% (SD 22.5) respectively. The PD controls were the least impaired, with a mean

of 94.4 % (SD 12.8). To establish where these group differences were located, six Mann-Whitney U tests were performed between groups. The results of these are presented in Table 10.

**Table 10. Mann-Whitney U Tests Between Groups In Second Order ToM Questions**

Group Comparison	N	U Value	Z Score For Corrected Ties
Behavioural Signs & Passivity Phenomena	21	18.5	-2.76**
Behavioural Signs & Paranoid Delusions	20	24.5	-2.16*
Behavioural Signs & PD Controls	29	1.5	-4.76**
Passivity Phenomena & Paranoid Delusions	19	37.5	-0.67
Passivity Phenomena & PD Controls	28	18.0	-3.88**
Paranoid Delusions & PD Controls	27	22.5	-3.50**

\* Significant at  $p < .05$ , \*\* Significant at  $p < .01$

Although there are problems with multiple comparisons, the analyses suggested significant differences in second order ToM performance between the PD controls and each of the TRS symptom subgroups. This is consistent with the means presented in Figure 2., which show that the three TRS symptom subgroups answered fewer second order ToM questions correctly than did the PD controls. The results support the hypothesis ( $1H_1$ ) which predicted that second order ToM performance would be significantly impaired in the three TRS symptom subgroups compared to the PD controls.

The results also suggested a significant difference in second order ToM performance between the behavioural signs symptom subgroup and the passivity phenomena symptom subgroup. This also supports the hypothesis ( $1H_1$ ), which predicted such a difference. However, the significant difference between the behavioural signs symptom subgroup and the paranoid delusion symptom subgroup is consistent with the null hypothesis ( $1H_0$ ), which predicted that there would not be a significant difference between any of the groups. The lack of a significant difference between

the paranoid delusions and passivity phenomena subgroups also supports the null hypothesis ( $1H_1$ ), which predicted there would not be a significant difference between the symptom subgroups in ToM performance.

Analysis of the responses to second order ToM question categories of false belief, deception prediction, and deception explanation given by participant groups using three 2 x 4 chi-squares, indicated significant associations between groups and whether a pass or fail was obtained in all three of the ToM question categories. The results of these analyses are presented in Table 11. The contingency tables accompanying these analyses are presented in Tables 12., 13. & 14. respectively. The results of all these analyses suggested the majority of passes to the 3 ToM question categories were achieved by the PD controls.

**Table 11. Chi-Square Test Results Between ToM Question Categories & Groups**

	Chi-Square ( $\chi^2$ ) Value	d.f.
False Belief & Groups	15.99**	3
Deception Prediction & Group	22.88**	3
Deception Explanation & Groups	31.60**	3

\*\* Significant at  $p < .01$

**Table 12. Contingency Table Between False Belief Question Category & Groups**

		Group			
Answer given in ToM question		Behavioural Signs	Passivity Phenomena	Paranoid Delusions	PD Controls
	Fail	7 (14.6%)	1 (2.1%)	1 (2.1%)	1 (2.1%)
	Pass	4 (8.3%)	9 (18.8%)	8 (16.7%)	17 (35.5)
	Column Total	11 (22.9%)	10 (20.8%)	9 (18.8%)	18 (37.5%)
		Row Total			
		10 (20.8%)	38 (79.2%)	48 (100%)	

**Table 13. Contingency Table Between Deception Prediction Question Category & Groups**

		Group			
Answer given in ToM question		Behavioural Signs	Passivity Phenomena	Paranoid Delusions	PD Controls
	Fail	11 (22.9%)	5 (10.4%)	6 (12.5%)	2 (4.2%)
	Pass	0 (0%)	5 (10.4%)	3 (6.3%)	16 (33.3%)
	Column Total	11 (22.9%)	10 (20.8%)	9 (18.8%)	18 (37.5%)
		Row Total			
		24 (50%)	24 (50%)	48 (100%)	

**Table 14. Contingency Table Between Deception Explanation Question Category & Groups**

	Group				
	Behavioural Signs	Passivity Phenomena	Paranoid Delusions	PD Controls	Row Total
Answer given in ToM question					
Fail	11 (22.9%)	7 (14.6%)	6 (12.5%)	0 (0%)	24 (50%)
Pass	0 (0%)	3 (6.3%)	3 (6.3%)	18 (37.5%)	24 (50%)
Column Total	11 (22.9%)	10 (20.8%)	9 (18.8%)	18 (37.5%)	48 (100%)

### **3.4 Second Order ToM Performance & Neuropsychological Test Performance**

In examining ToM performance and neuropsychological test performance in all groups, second order ToM performance was scored so that each participant was assigned to one of four categories. These categories were those who failed to answer any ToM questions correctly, those who answered one ToM question correctly, those who answered two ToM questions correctly and those who answered all three ToM questions correctly. Because no between group variation in first order ToM performance was found, no comparison with neuropsychological test performances was carried out.

#### **i. Comparison Between ToM Performance & WAIS-R Full Scale IQ**

Three of the 60 participants did not have WAIS-R full scale IQs and were excluded from this analysis. A Kruskal-Wallis one way ANOVA between the number of second order ToM questions passed and WAIS-R full scale IQ, indicated a significant between group difference ( $H = 9.78$ ,  $d.f. = 3$ ,  $p < .05$ ). Although caution is needed in the interpretation of the results, to establish where the significant group differences were located, six Mann-Whitney U tests were performed between the number of second order ToM questions passed in WAIS-R full scale IQ. The results of these analyses are presented in Table 15. They suggested significant differences between the no ToM questions passed group and the one, two and three ToM questions passed

groups. These differences are confirmed by examining the mean WAIS-R full scale IQs in each of the number of ToM questions passed categories presented in Table 16. This shows that the no ToM questions passed group had a mean full scale IQ within the mid 70s, while the one, two & three ToM questions passed groups had mean full scale IQs within the low to mid 90s. These results support the null hypothesis ( $2H_0$ ) which predicted that second order ToM performance would be related to WAIS-R full scale IQ.

**Table 15. Mann-Whitney U Tests Between Second Order ToM Questions Passed Groups In WAIS-R Full Scale IQ**

Comparison	N	U Value	Z Score Corrected For Ties
0 & 1 ToM Questions Correct	23	26.0	-2.00*
0 & 2 ToM Questions Correct	23	14.5	-2.78**
0 & 3 ToM Questions Correct	25	6.5	-3.43**
1 & 2 ToM Questions Correct	32	122.5	-0.21
1 & 3 ToM Questions Correct	34	143.0	-0.03
2 & 3 ToM Questions Correct	34	143.5	-0.02

\* Significant at  $p < .05$ , \*\* Significant at  $p < .01$

**Table 16. Mean WAIS-R Full Scale IQs By Number Of Second Order ToM Questions Passed**

Number Of ToM Questions Passed	N	Mean WAIS-R IQ (SD)	Range
0 Questions Passed	7	76.6 (6.3)	68 - 86
1 Question Passed	16	95.2 (21.0)	73 - 150
2 Questions Passed	16	93.6 (15.0)	75 - 132
3 Questions Passed	18	92.1 (10.9)	80 - 114

## **ii. Comparison Between ToM Performance & WMS-R Performance**

The mean WMS-R scores for prose immediate recall, prose delayed recall, design immediate recall and design delayed recall by the number of second order ToM questions passed are presented in Tables 17., 18., 19. & 20. respectively. A Kruskal-Wallis one way ANOVA for each WMS-R score by number of second order ToM questions passed is presented in Table 21. These indicated a significant difference

between groups in prose delayed recall scores and design delayed recall scores. No differences were found in prose immediate and design immediate recall scores.

**Table 17. Mean WMS-R Prose Immediate Recall Scores By Number Of Second Order ToM Questions Passed**

Number Of ToM Questions Passed	N	Mean Score (SD)	Range
0 Questions Passed	5	13.4 (15.7)	2 - 40
1 Question Passed	17	16.5 (17.4)	2 - 59
2 Questions Passed	5	32.5 (30.7)	3 - 97
3 Questions Passed	18	38.3 (29.6)	2 - 82

**Table 18. Mean WMS-R Prose Delayed Recall Scores By Number Of Second Order ToM Questions Passed**

Number Of ToM Questions Passed	N	Mean Score (SD)	Range
0 Questions Passed	4	3.7 (3.5)	2 - 9
1 Question Passed	17	17.4 (18.5)	0 - 69
2 Questions Passed	15	39.0 (33.1)	4 - 94
3 Questions Passed	18	39.2 (24.5)	9 - 83

**Table 19. Mean WMS-R Design Immediate Recall Scores By Number Of Second Order ToM Questions Passed**

Number Of ToM Questions Passed	N	Mean Score (SD)	Range
0 Questions Passed	6	24.3 (35.3)	1 - 85
1 Question Passed	17	26.4 (31.7)	1 - 94
2 Questions Passed	16	42.8 (33.8)	3 - 97
3 Questions Passed	17	44.4 (32.3)	3 - 96

**Table 20. Mean WMS-R Design Delayed Recall Scores By Number Of Second Order ToM Questions Passed**

Number Of ToM Questions Passed	N	Mean Score (SD)	Range
0 Questions Passed	5	8.8 (16.3)	1 - 38
1 Question Passed	17	22.1 (30.4)	1 - 88
2 Questions Passed	16	38.6 (35.3)	0 - 99
3 Questions Passed	17	38.6 (31.6)	2 - 98

**Table 21. Kruskal-Wallis One Way ANOVA Results Between WMS-R Categories In The Number of Second Order ToM Questions Passed**

WMS-R Categories	Kruskal-Wallis Value (H)	d.f.
WMS-R Prose Immediate Recall	7.79	3
WMS-R Prose Delayed Recall	16.74**	3
WMS-R Design Immediate Recall	6.64	3
WMS-R Design Delayed Recall	7.87*	3

\* Significant at  $p < .05$ , \*\* Significant at  $p < .01$

Analysis of the differences between groups in prose delayed recall scores using six Mann-Whitney U tests suggested significant differences between the no and two ToM

questions passed, no and three ToM questions passed, and one and three ToM questions passed. The results from these Mann-Whitney U tests are presented in Table 22. It can be seen in Table 18., that no ToM questions passed group had the lowest score, followed by the one ToM question passed group. The two and three ToM questions passed groups had similar, higher scores.

**Table 22. Mann-Whitney U Test Results Between Number Of Second Order ToM Questions Passed For WMS-R Prose Delayed Recall Scores**

Comparison	N	U Value	Z Score (Corrected for Ties)
0 & 1 ToM Questions Passed	21	12.0	-1.97*
0 & 2 ToM Questions Passed	19	1.0	-2.90**
0 & 3 ToM Questions Passed	22	0.5	-3.02**
1 & 2 ToM Questions Passed	32	71.0	-2.13*
1 & 3 ToM Questions Passed	35	65.0	-2.90**
2 & 3 ToM Questions Passed	33	122.5	-0.45

\* Significant at  $p < .05$ , \*\* Significant at  $p < .01$

Analysis of the differences between groups in design delayed recall scores using six Mann-Whitney U tests suggested significant differences between the no ToM question passed group and the three ToM questions passed group. Significant differences were also found between the one ToM question passed group and the three ToM questions passed group. The results from these Mann-Whitney U tests are presented in Table 23. These differences can be seen by examining the means presented in Table 20., which show that the no ToM questions passed group had the lowest score, followed by the one ToM question passed group. The two and three ToM questions passed groups had similar higher scores.

**Table 23. Mann-Whitney U Test Results Between Number Of Second Order ToM Questions Passed For WMS-R Design Delayed Recall Scores**

Comparison	N	U Value	Z Score (Corrected for Ties)
0 & 1 ToM Questions Passed	22	25	-1.39
0 & 2 ToM Questions Passed	21	22.5	-1.46
0 & 3 ToM Questions Passed	21	11	-2.47*
1 & 2 ToM Questions Passed	33	102	-1.23
1 & 3 ToM Questions Passed	34	80	-2.22*
2 & 3 ToM Questions Passed	33	130	-0.22

\* Significant at  $p < .05$

The results from the prose immediate recall and design immediate recall scores support the hypothesis ( $2H_1$ ) of a non significant association between ToM and WMS-R performance. However, the results from the prose delayed recall and the design delayed recall support the null hypothesis ( $2H_0$ ) which predicted that ToM performance would be related to performance in neuropsychological tests of memory, i.e. that the greater the number of second order ToM questions passed, the greater would be the raw scores in WMS-R prose delayed and design delayed recall.

### **iii. Comparison Between ToM Performance & CFT Performance**

The categorical quality of the CFT copy and recall sequence ratings, and the number of second order ToM questions passed, suggested a Chi-square was the most appropriate method of analyses.

#### **Copy Sequence Ratings**

Due to low expected cell frequencies, categories were combined to create a 2 x 2 contingency table between the number of second order ToM questions passed (0 or 1 or more), and pass or fail ratings in the CFT copy sequences. Analysis suggested a non significant association between number of second order ToM questions passed and the copy sequence ratings ( $\chi^2 = 0.01$ , d.f = 1, n.s.). Twenty four patients were without CFT copy sequence ratings and were excluded from the analysis. No participants obtained either a six (Substitute) or seven (Scrawl) rating. The contingency table to accompany the analysis is presented in Table 24. This shows, of those participants having passed one or more second order ToM questions, similar numbers obtained 1 & 2 to those who obtained 3, 4 & 5 ratings in the CFT copy



sequences. It also shows there was no difference in CFT copy sequence ratings among those who failed to pass any second order ToM questions.

**Table 24. Contingency Table Between Number Of ToM Questions Passed & Performance In The CFT Copy Sequence Ratings**

CFT Copy Sequence Ratings*	Number of Second Order ToM Questions Passed		
	1 or more passed	0 passed	Row Total
1 & 2	15 (41.7%)	2 (5.6%)	17 (47.2%)
3,4 & 5	17 (47.2%)	2 (5.6%)	19 (52.8%)
Column Total	32 (88.9%)	4 (11.1%)	36 (100%)

\*Key for CFT Copy Sequence Ratings:

1 - Central rectangle, 2 - Detail rectangle, 3 - Perimeter, 4 - Piecemeal, good result, 5 - Piecemeal, poor result

### Recall Sequence Ratings

Due to low expected cell frequencies, categories were combined to create a 2 x 2 contingency table between the number of second order ToM questions passed (0 or 1 or more) and pass or fail ratings in the CFT recall sequences. Analysis suggested a non significant association between the number of second order ToM questions passed and the recall sequence ratings ( $\chi^2 = 0.91$  d.f = 1, n.s.). Thirty four patients were without CFT recall sequence ratings and were excluded from the analysis. No participants obtained either a six (Substitute) or a seven (Scrawl) rating. The contingency table to accompany this analysis is presented in Table 25. Although not significant and cell numbers were small, this shows a small tendency for those who passed one or more second order ToM questions to obtain a recall sequence rating of one (Central rectangle) or two (Detail rectangle).

**Table 25. Contingency Table Between Number Of ToM Questions Passed & Performance In The CFT Recall Sequence Ratings**

CFT Recall Sequence Ratings*	Number of Second Order ToM Questions Passed		
	1 or more passed	0 passed	Row Total
1 & 2	16 (61.5%)	2 (7.7%)	18 (69.2%)
3, 4 & 5	7 (26.9%)	1 (3.8%)	8 (30.8%)
Column Total	23 (83.5)	3 (11.5%)	26 (100%)

\*Key for CFT Recall Sequence Ratings:

1 - Central rectangle, 2 - Detail rectangle, 3 - Perimeter, 4 - Piecemeal, good result, 5 - Piecemeal, poor result

### **Overall interpretation Of CFT Performance & ToM performance**

Both the results of the CFT copy sequence ratings and the recall sequence ratings support the hypothesis ( $2H_1$ ), which predicted that ToM performance and CFT performance would be unrelated.

#### **iv. Comparison Between ToM Performance & Classical Weigl**

The categorical quality of the Classical Weigl ratings and the number of second order ToM questions passed, suggested a Chi-square was the most appropriate analysis. Four participants were without Classical Weigl ratings and were excluded from the analysis. Using a 2 x 2 contingency table between the number of second order ToM questions passed (0 or 1 or more) and pass or fail ratings in the Classical Weigl, suggested a significant association ( $\chi^2 = 6.22$ , d.f = 1,  $p < .05$ ). Thus, the number of second order ToM questions passed was significantly associated with Classical Weigl ratings. This supported the hypothesis ( $2H_0$ ) which predicted ToM performance and Classical Weigl performance would be related. The contingency table to accompany this analysis is presented in Table 26. This shows a clear tendency among those who obtained pass ratings in the Classical Weigl to also pass one or more second order ToM questions.

**Table 26. Contingency Table Between Number Of ToM Questions Passed & Classical Weigl Ratings**

Classical Weigl Ratings*	Number of Second Order ToM Questions Passed		
	1 or more passed	0 passed	Row Total
Pass	40 (71.4%)	2 (3.6%)	42 (85%)
Fail	10 (17.9%)	4 (7.1%)	14 (25%)
Column Total	50 (89.3%)	6 (10.7%)	56 (100%)

\*Classical Weigl Ratings, Pass = Superior Pass, Pass or Equivocal Pass. Fail = Equivocal Fail, Fail or Contaminated Fail.

## **4. Discussion**

### **4.1 Summary Of Results**

#### **i. Demographic Details**

The analysis of participants' demographic details including age, number of years detained in the Special Hospital, age at first psychiatric diagnosis, duration of illness and level of educational attainment, suggested that the three TRS symptom subgroups were similar in all these variables. However, further analysis suggested the behavioural signs symptom subgroup had a statistically significant lower WAIS-R full scale IQ than the passivity phenomena symptom subgroup.

The analysis of demographic variables also suggested significant differences between the three TRS symptom subgroups and the PD controls in age, number of years detained in the Special Hospital and duration of illness. The behavioural signs symptom subgroup also had a significantly lower IQ than the PD controls. The PD controls mean age was approximately ten years younger than that of the three TRS symptom subgroups, they had been detained in the Special Hospital for a shorter period of time and had an illness duration of just under nine years compared to the fifteen to seventeen years for the three TRS symptom subgroups. The four groups did not significantly differ in their age of first psychiatric diagnosis or level of educational qualifications obtained.

In attempting to explain these differences, it would seem that, by definition, to be classified as 'treatment resistant', those individuals with schizophrenia would be older than those not classified as such. Consequently, it is likely that they will have been detained in the hospital for a longer period of time. Therefore, the lower number

of years detained in the Special Hospital and lower mean duration of illness in the PD controls would appear to be accounted for by their younger age. These results are consistent with the Special Hospital's own data on patients' characteristics, which suggest that patients classified with psychopathic disorder are ten to fifteen years younger than those classified with mental illness and have been detained for shorter periods of time (Hospital Patient Administration System, 1996).

To summarise, as all groups were fairly representative of their respective patient groups within the hospital, the differences between groups suggested that the PD controls and TRS symptom subgroups differed in several 'demographic' ways including age, number of years detained in the Special Hospital, duration of illness and WAIS-R full scale IQ. As well as illustrating the difficulties in attempting to match forensic Special Hospital patient samples on demographic characteristics in group comparison studies, the differences may have implications for the interpretation of the differences in ToM performance between the groups.

## **ii. Inter-rater Reliability Of SRC**

The 83.3% level of overall agreement and high Cohen's Kappa value, suggest that the SRC had a good level of agreement between independent raters. This suggests the independent raters used the measure to classify patients in a similar way and may demonstrate the checklist's reliability in assigning patients to one of the three TRS symptom subgroups.

### **iii. First & Second Order Reality Questions**

Because all participants from all groups answered all first order reality questions correctly, this suggests that there were no memory problems with the first order ToM stories. Therefore, all participants were able to recall a target piece of information thought to be crucial in the comprehension of the ToM stories.

The results of the second order reality questions were not as clear cut. Of the total sample of 60 participants only 48 gave correct answers for all three second order reality questions, i.e. were able to recall a target piece of information thought to be crucial in the comprehension of the ToM stories. Analysis suggested there were no differences between groups in the number of second order reality questions passed. Therefore, the problems in recalling target information from the second order stories were not restricted to any particular group. These results therefore suggested the second order ToM stories may have a memory component, but that this did not appear to influence any one group more than another group. Thus, to remove the confounding influence of memory, all those who failed to answer all second order reality questions correctly were excluded from the analysis of second order ToM performance. Although the proportion of participants who failed the second order reality questions was similar to that obtained by Frith & Corcoran (1996), the absence of any differences between groups was not. Frith & Corcoran found their behavioural signs symptom subgroup performed worse than the other groups on this measure.

### **iv. First & Second Order ToM Questions**

The results of the first order ToM analysis suggested no significant difference between the groups in performance. For all groups, most participants appeared able to

appreciate that another may have a false belief about the physical state of the world. However, two participants, one classified with predominantly behavioural signs symptoms and one classified with predominantly paranoid delusion symptoms, failed to pass either all first order ToM questions (the predominantly behavioural signs symptoms participant) or two first order ToM questions (the predominantly paranoid delusion symptoms participant). Therefore, although the groups as a whole did not differ in first order ToM performance, there were two TRS participants, particularly the participant with predominantly behavioural signs symptoms, who had problems with first order ToM, despite answering all the first order reality questions correctly.

The results of the second order ToM analysis suggested a significant difference between groups in performance, with each of the TRS symptom subgroups performing significantly worse than the PD controls. Therefore, the TRS symptom subgroups appeared to have difficulty in appreciating that an individual may have a false belief about the mental state of another individual. Furthermore, as all participants who failed to pass all second order reality questions were excluded from the analysis, this suggested the second order ToM impairment was not due to a failure to comprehend or remember the story. Combined, the results suggested that the behavioural signs symptom subgroup was the most impaired in second order ToM, followed by the paranoid delusion symptom subgroup and then by the passivity phenomena symptom subgroup. The results also showed that some members of the PD control group failed to pass some of the second order ToM questions.

In terms of the hypothesis (1H<sub>1</sub>) and the studies by Corcoran et al. (1995), and Frith & Corcoran (1996), these results provide partial support for the prediction that the TRS

symptom subgroups will be more impaired in ToM than the PD controls. The support is only partial, as the impairment was found only in second order ToM and not first order ToM. Thus, the results are not wholly consistent with  $1H_1$ , which predicted impairment in both first and second order ToM. The analysis of the three TRS symptom subgroups is also only partially consistent with hypothesis  $1H_1$ . This hypothesis predicted that the behavioural signs and the paranoid delusion symptom subgroups would be more impaired than the passivity phenomena symptom subgroup in second order ToM. However, the results suggested a significant difference only between the behavioural signs and passivity phenomena symptom subgroups, and not between the paranoid delusion and passivity phenomena symptom subgroups.

Several explanations may account for the failure to find complete support for the hypothesis ( $1H_1$ ). The first is that first order ToM impairments are not present in this sample of TRS patients. As these patients represent a highly specific sample of individuals with schizophrenia, it may be that they are not representative of the schizophrenia population as a whole and hence are very different from the sample studied by Corcoran et al. (1995) and Frith & Corcoran (1996). This suggestion is supported by the mixed profiles of neuropsychological performance present in forensic patients with schizophrenia and highlighted in the introduction. For example, Barber (1994), found a forensic schizophrenia sample performed better than a non forensic sample in tests of higher executive functioning.

As is discussed in more detail later, the second possibility is that the findings may also be due to one or more methodological shortcoming. Of particular importance is



the relatively low number of participants in each subgroup and the way in which participants were assigned to symptom subgroups.

#### **v. Second Order ToM Performance & Neuropsychological Test Performances**

The results from the analysis of second order ToM and neuropsychological test performances (WAIS-R full scale IQ, WMS-R immediate and delayed prose recall, and immediate and delayed design recall, CFT copy and recall sequences and Classical Weigl ratings), suggest a mixed pattern of findings. A significant relationship was found between an individual's performance in the second order ToM questions, their WAIS-R full scale IQ, performance in the delayed recall of prose and designs of the WMS-R and ratings obtained in the Classical Weigl, but not with their CFT copy and recall sequence ratings.

In terms of the hypothesis ( $2H_1$ ), which predicted there would not be any relationship between ToM performance and neuropsychological test performance, the absence of a relationship between second order ToM performance and CFT ratings is consistent with this prediction. However, the relationship between second order ToM performance, WAIS-R full scale IQ, WMS-R delayed prose and design results and the Classical Weigl support the null hypothesis ( $2H_0$ ). A participant's performance in the second order ToM stories therefore appears to be related to their WAIS-R full scale IQ, with a greater number of correct responses to second order ToM questions being related to a higher full scale IQ. Likewise, performance in the second order ToM stories appeared to be related to raw scores in the delayed recall of prose and designs sections of the WMS-R, with a greater number of second order ToM questions passed related to better raw scores in the delayed recall of prose and designs. In addition,

individual's who passed one or more second order ToM questions were more likely to obtain a pass rating in the Classical Weigl (test of the ability to shift thinking from one concept to another). In contrast, an individual's performance in the second order ToM stories appears to be unrelated to their CFT copy and recall sequence ratings. Therefore, an individual's second order ToM performance was not significantly related to their performance in a test of organisation and planning. However, although not significant, the data suggested a small trend with individuals who passed one or more second order ToM questions also obtaining good CFT recall sequence ratings.

Although consistent with the results obtained by Corcoran et al. (1995), who found a positive correlation between IQ and performance in their hinting task within their schizophrenia patients, but not within their non patient 'normal' controls, the result is not consistent with those obtained by Frith & Corcoran (1996), who failed to find a significant difference between their schizophrenia patients and non psychotic and non psychiatric controls in IQ. More detailed analysis of the performance of individual symptom subgroups in second order ToM and full scale IQ was prevented by small sample sizes. This, and the absence of a normal distribution in the data, also prevented an analysis of covariance (ANCOVA), which would have allowed the influence of IQ to have been removed from the analysis of second order ToM.

In terms of memory, it seems that participants who were the most impaired in the second order ToM task were also the most impaired in the WMS-R prose delayed recall and, to a lesser extent, in design delayed recall. This is unsurprising, as those with poor memories performed poorly in the ToM task because they were less likely to remember the stories. However, as those participants who failed to answer all

second order reality questions correctly were excluded from the analysis of second order ToM performance between groups, it seems there may be rather more to the relationship than poor memory. Although the results do not clear the confusion regarding the relationship between ToM and memory, they suggest the significance of memory for the delayed recall of prose material. However, the result is only suggestive and requires further investigation. This might aim to determine whether the relationship is a causal one or simply an association. As is discussed later, the ToM task has the problem of being memory 'loaded'. Like the influence of WAIS-R full scale IQ, further statistical analysis using an ANCOVA with memory as a 'covariate' on second order ToM performance would be useful to pursue.

#### **4.2 Methodological Limitations Of Study**

i. Although the study is suggestive of a second order ToM impairment in the three TRS symptom subgroups in comparison to the PD controls, there were individual exceptions, with some TRS participants performing well in second order ToM. Likewise, there were some PD controls who did not perform well in second order ToM. This suggests the examination of group averages overlooks important information about individual performances. Therefore, the group approach to examining such difficulties may be flawed and it may be that an individual case analysis would be more informative. This would allow an examination of the individual peculiarities in ToM profiles and comparison with other individual variables such as other test information. The advantages of using a single case methodology are discussed by Miller (1993), who suggests that group studies in neuropsychology are often misleading, particularly when there are discrepancies in results between studies. In addition, the use of a group study often assumes groups are

homogeneous in some qualities. As was demonstrated by the differences in demographic characteristics, this is not the case in the present study, with the TRS and PD controls groups appearing to differ in most characteristics. Therefore, any one or more of these differences may have contributed to the group differences found here in ToM performance.

ii. In support of the individual case approach is the problem concerned with the relatively small sample sizes in each of the TRS symptom subgroups. As this was a highly specific sample of individuals with schizophrenia, there was only a limited number of potential participants in the hospital. Consequently, those who decided to take part in the study were a highly selective sample. In addition, although the sample were representative of specific sections of hospital patients, individuals all had in common their consent to participate in the study. In contrast, there were a small sample of patients, particularly those with paranoid features, who were perhaps the most clinically interesting, but who refused to participate in the study. These individuals may have produced a different profile of ToM performance.

iii. As has been described previously, the participants all had in common their consent and agreement to participate in the study. Although this may not be a significant factor within a non forensic setting, within secure environments such as a Special Hospital, agreement to take part in research studies is an important factor to discuss, as has been described in more detail by Gresswell & Kruppa (1994) and Megargee (1995). This is especially so because of the higher degree of caution often present among patients regarding the disclosure of personal information which affects motivation to take part in research. The sample included in the analysis is therefore

biased in that it reflects only the performances of those patients who were willing to take part.

iv. As all the patients were contained within a highly structured environment, which constantly seeks to alter their attitudes, personality and behaviour, it may have had implications on the way in which patients responded to the ToM task. Unlike a non forensic out-patient sample, such as that described by Frith & Corcoran (1996), the present sample were only open to a limited number of experiences within the hospital and therefore may have been less able to practise ToM skills or at least less used to situations used within the ToM task. A ToM task which is more 'tuned' in to the patients immediate environment may therefore be more relevant and valid.

v. The ToM task is limited in that it relies on memory as well as on ToM abilities. As is noted by Frith & Corcoran (1996), the ToM task and particularly the second order stories are memory loaded. In their study, individuals failed the reality questions as well as the ToM questions. This was the case in the current study, with 12 participants (20%) of the total sample failing to pass all the reality questions associated with the second order stories. With the exclusion of these participants from the analysis of second order ToM performance, the sample size was reduced even further. In addition, an alternative interpretation of the results may be that the second order ToM performance of those participants who passed all the reality questions, may be dependent on 'good' memories rather than 'good' ToM abilities. The development of a task which covers both first and second order ToM and in which both ToM tasks are less 'memory loaded' is therefore needed before it will be possible to separate out the effects of memory from ToM abilities.

vi. The SRC may be limited in its way of classifying individuals according to their predominant symptoms. Although producing a good level of inter-rater agreement, the SRC is open to bias in that it attempts to classify and categorise individuals according to their most predominant symptom. This could be problematic, as there is the question of whether it is accurate to divide individuals with schizophrenia into discrete categories. For example, within the TRS sample, there were no participants with just behavioural signs, just passivity phenomena or just paranoid delusions. In contrast, the majority of the TRS participants had symptoms from more than one symptom category and in many cases the highest score in a particular symptom category was used to determine the symptom subgroup into which they were placed. Although convenient for research purposes, this classification system used here to divide the TRS sample into symptom subgroups is limited.

#### **4.3 Theoretical Implications**

The results are partially consistent with the theoretical background of ToM in schizophrenia described by Frith (1992, 1994). Specifically, in terms of the empirical evidence to date, they support only the second order ToM deficit account of schizophrenia, and provide no evidence that first order ToM is also impaired in a schizophrenia sample. Therefore, the TRS sample's performance as a whole suggested they were able to appreciate that an individual may have a false belief about the physical state of the world, but that they had difficulty in appreciating that an individual may have a false belief about the mental state of another individual. This difficulty also appears to be particularly worse in those TRS participants with behavioural signs as their predominant symptoms. These results are not conclusive and need to be repeated with a larger sample size and using a more valid system of

assigning participants to specific symptom subgroups. Nevertheless, it remains the case that the results may reflect real differences between TRS forensic and non forensic schizophrenia samples.

Adding to the confusion within the theoretical framework of ToM in schizophrenia, is the finding of a significant relationship between second order ToM performance and general intellectual functioning (WAIS-R full scale IQ), a significant relationship between second order ToM and delayed memory performance (WMS-R, prose and design delayed recall), and a significant relationship between second order ToM and the ability to shift thinking from one concept to another (Classical Weigl ratings). The relationship between ToM and general intellectual functioning does not support Frith (1992, 1994), who suggested that ToM ability is IQ independent and not related to general intellectual functioning. In contrast, the results presented here suggest that in order to have good second order ToM abilities, a minimum level of general intellectual functioning is required. Therefore, it is possible that the two abilities are connected in some way. However, whether the two abilities are causally related or merely correlated, remains to be established. Given that there may indeed be some form of relationship between intellectual functioning and second order ToM, it may be informative to examine the link more closely, including whether, for example, ToM abilities are related to verbal or visual spatial skills. In addition, with large enough numbers, it would be interesting to examine the ToM abilities of 'high' and 'low' IQ groups. A similar interpretation and method may be applied to the positive relationship between second order ToM performance and performance ratings in the Classical Weigl (ability to shift thinking from one concept to another). For both positive relationships, it means that it is not possible to say the passing of ToM

questions was determined by the ability to understand other's mental states, since it may have also been determined by good general intellectual functioning and good higher executive functioning (particularly the ability to shift thinking from one concept to another).

In terms of the finding of a relationship between second order ToM and low raw scores in the WMS-R delayed recall of prose and designs, this also suggests that the two abilities may be related (at least in terms of the task used). Therefore, having good second order ToM ability may be related to having good delayed recall of both prose and design material. Frith (1992, 1994), notes that he is unclear about the relationship between ToM and memory. However, the results obtained here provide some evidence to suggest that second order ToM performance and delayed memory ability, particularly for prose material, are related. However, as previously described, the ToM task used in the current study may be 'memory loaded'. In order to be certain of the relationship between ToM and memory, a task would need to be developed which is less dependent on memory. This may be easier in theory than practice, as the ability to appreciate the mental states of others must be dependent upon a minimum level of memory.

Consistent with the theoretical framework of Frith (1992, 1994), is the finding that second order ToM performance was not related to formal tests of organisation, planning (i.e. CFT copy and recall sequences). This finding suggests that second order ToM may be determined by a skill separate from those involved in the organisation and planning of material. Although this had been speculated to be the case by Frith (1992, 1994), it had not previously been assessed formally. However, although the



relationship was not significant, a small trend was observable in the data to suggest that there might indeed be a link, where good second order ToM ability was associated with better CFT recall ratings in organisation and planning. With a larger sample size, it would be interesting to re-examine this relationship.

#### **4.4 Clinical Implications**

As the results obtained are suggestive of a second order ToM impairment in the TRS symptom subgroups, there are several potential clinical implications.

With the recognition of a ToM impairment in some patients with schizophrenia within the hospital, are the potential implications for clinical management. As well as helping to account for some of the 'odd' behaviour and social skills deficits present in this patient group, recognising second order ToM impairments, might allow adjustments to be made in the everyday situations encountered by patients (i.e. developing 'ToM friendly environments'). In addition, with more research, recognising a second order ToM deficit in schizophrenia could stimulate the development of an intervention targeted at improving existing ToM abilities. This may be particularly significant given the likely relationship between ToM performance and general intellectual functioning and memory. Green (1991), in a review article, argued that the identification of cognitive deficits in schizophrenia represents the first step towards developing effective remediation strategies. Although not directed towards ToM deficits, Green suggests, that from models similar to that used in the rehabilitation of head injured patients, a number of possible techniques could be developed for the re-training of cognitive deficits found in patients with schizophrenia. The development of an intervention targeted at improving ToM

abilities would seem to be particularly important in terms of the relationship between social skills and outcome. As highlighted in the introduction, having ToM skills appears crucial in possessing good social skills, and possessing good social skills appears to be a strong predictor of a positive outcome and low risk of relapse in schizophrenia (e.g. Mueser et al., 1990; Johnstone et al., 1990).

Another potential clinical implication of recognising a second order ToM impairment in some forensic patients with schizophrenia is the possible relationship with the future risk of re-offending. As ToM may be closely associated with an individual's capacity to empathise with another and perhaps feel guilt (e.g. Baron-Cohen, 1996), it might be hypothesised that an individual with a second order ToM impairment would not be able to empathise with another. The development of a ToM assessment within the context of a risk assessment might therefore be useful. This may be particularly significant, since such tasks would appear to be beyond bluffing, unlike many empathy tasks, since ToM answers are not influenced by what is the 'socially desirable' answer. However, this view is also dependent on the assumption that having ToM ability is independent of other abilities, such as problem solving and organisation skills. Although this area needs to be explored further, preliminary evidence obtained in the current study suggests, within the current sample, ToM performance is unrelated to performance in tests of organisation and planning, but is related to the ability to shift one's thinking from one concept to another.

#### **4.5 Future Research**

This should begin by attempting to improve the methodological limitations previously highlighted, such as increasing the sample size as a whole and improving the validity /

system of categorising TRS symptom subgroups. In addition, the use of a single case analysis approach in which ToM performance is examined at an individual level may be more informative than a group comparison approach. This would allow a more comprehensive investigation of ToM performance in relation to a variety of other factors such as personal history, diagnosis, performance in other cognitive & non cognitive tests and past & present behaviours. This is supported by the individual exceptions to the overall group performances in the current study, i.e. that some members of the TSR symptom subgroup were not impaired in second order ToM and that some members of the PD controls were impaired in second order ToM.

As a forensic sample, it would be interesting and perhaps useful, to examine the relationship between ToM performance and offence history. Such an examination may provide insight into why some offences occurred. As highlighted, it might also have implications for the assessment of future risk of re-offending. This analysis could be conducted at a group level, in which specific offence categories could be compared, and at an individual case analysis level, in which the individual circumstances of an offence could be examined in terms of a ToM framework. With the availability of such information in patient records kept in the hospital, the potential for conducting this research is possible and would provide an interesting addition to the current study.

Unlike most non forensic community samples, the availability of other information from records would allow individual ToM performance to be compared with a number of other variables. For most patients, these include a wide range of historical background information such as developmental, family, schooling, work, drug and

alcohol abuse and offence histories. There is also more recent information available including more detailed neuropsychological profiles and, for some patients, neurophysiological information such as various forms of electrophysiological (e.g. EEG) and brain scans. The addition of the ToM data might therefore provide a useful complement to the existing data base of patient information. It would also allow the testing of several hypotheses about ToM performance, which at present remain speculations, such as the relationship between impaired ToM ability and brain damage in the frontal and posterior regions (p. 158, Frith, 1994).

In the longer term, outcome research is also possible. TRS participants could be re-tested at various points in the future, such as prior to being transferred from the hospital. This would allow the hypothesis of whether ToM ability is a 'trait' or a 'state' characteristic to be assessed. Following Frith & Corcoran's (1996) reasoning, an improvement in an individual's clinical condition should be associated with an improvement in their ToM ability, i.e. it is a 'state' characteristic. If second order ToM is related to general intellectual functioning, a similar improvement might also be expected in IQ.

#### **4.6 Conclusions**

i. There are significant differences between the TRS symptom subgroups and the PD controls in demographic characteristics including age, number of years detained in the Special Hospital and duration of illness. Specifically, the TRS symptom subgroup were significantly older, had been detained for longer and had been ill for a longer period of time.

ii. There were no significant differences between the TRS symptom subgroups and PD controls in the age first given a psychiatric diagnosis and in the distribution of educational qualifications. However, the behavioural signs symptom subgroup had a mean WAIS-R full scale IQ significantly lower than that of the PD controls, the passivity phenomena and paranoid delusion symptom subgroups.

iii. There were no significant differences between the three TRS symptom subgroups and PD controls in first order ToM, but all three TRS symptom subgroups were significantly more impaired than the PD controls in second order ToM. There were also differences within the three TRS subgroups in second order ToM, with the behavioural signs symptom subgroup being significantly more impaired than the passivity phenomena and paranoid delusion symptom subgroups.

iv. Impaired performance in second order ToM appears to be related to lower general intellectual functioning (WAIS-R full scale IQ) and poor delayed recall of both prose and design material (WMS-R, prose delayed recall and designs delayed recall).

v. Second order ToM performance, organisational and planning abilities (using CFT copy and recall sequences) appear to be unrelated, whilst second order ToM performance and the ability to shift thinking from one concept to another (using Classical Weigl), appear to be related.

vi. Combined, the results obtained from the present study provide partial support for the theoretical framework of ToM in schizophrenia outlined by Frith (1992, 1994).

Discrepancies with Frith's theory may suggest methodological differences between the studies, including for example the way participants were assigned to symptom subgroups. However, it also suggests that there may be a real difference in second order ToM between a 'treatment resistant' forensic schizophrenia sample and a non 'treatment resistant' non forensic schizophrenia sample.

vii. Theoretical framework and methodology are closely related, with the ToM task used being heavily memory loaded. Therefore, it is not possible to be certain that ToM is independent of other cognitive abilities until a ToM task is developed which is not influenced by other cognitive abilities.

viii. Individual performances suggest there are some who possess ToM abilities who should not, and some who do not, but who should, assuming that the theory is correct. This suggests a single case analysis approach may be more informative than a group comparison approach in examining why some patients with schizophrenia have ToM problems whilst others do not.

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## List Of Appendices

- i. ToM Task & Reality & ToM Questions
- ii. SRC.
- iii. Written Confirmation Of Ethical Approval.
- iv. Letter Written To RMO Asking Permission To Approach Individual Patients.
- v. Written Outline & Patient Consent Form.

**Theory of Mind (ToM) Answer Sheet**

Number.....

**Answer Summary**

**1. First Order False Belief**

ToM Question.....

Memory Question.....

**2. First Order Deception - Prediction**

ToM Question.....

Memory Question.....

**3. First Order Deception - Explanation**

ToM Question.....

Memory Question.....

Overall First Order ToM performance.....% of questions correctly answered.

Overall First Order memory performance.....% of questions correctly answered.

**4. Second Order False Belief**

ToM Question.....

Memory Question.....

**5. Second Order Deception - Prediction**

ToM Question.....

Memory Question.....

**6. Second Order Deception - Explanation**

ToM Question.....

Memory Question.....

Overall Second Order ToM performance.....% of questions correctly answered.

Overall Second Order memory performance.....% of questions correctly answered.

## Theory Of Mind (ToM) Stories and Questions

### First Order False Belief

John has five cigarettes left in his packet. He puts his packet on the table and goes out of the room. Meanwhile, Janet comes in and takes one of John's cigarettes and leaves the room without John knowing.

### TOM Question:

When John comes back for his cigarettes, how many does he think he has left?

### Memory Question:

How many cigarettes are really left in John's packet?

### First Order Deception - Prediction

Mary has a box of chocolates which she puts in her top drawer for safe keeping. A few minutes later Burglar Bill comes in and asks Mary: "Where are your chocolates, in the top or the bottom drawer?". Mary doesn't want Bill to find her chocolates.

### TOM Question:

In which drawer does Mary say her chocolates are, the bottom or the top? Why?

### Memory Question:

Where are the chocolates really?

### First Order Deception - Explanation.

Sarah has saved £1 which she puts in her piggy bank where she thinks it will be safe. A little later Sly Sid comes along and asks Sarah: "Have you put your £1 in your piggy bank or your money box?". Sarah answers: "it's in my money box."

### TOM Question:

Why does Sarah say that the £1 is in her money box?

### Memory Question:

Where is the £1 really?

### **Second Order False Belief**

Sally and Ian are at the station because Sally has to catch a train home. Sally lives in Homesville but the train does not stop at Homesville station. Sally will have to get off at Neartown and walk. Sally goes to buy a magazine to read on her journey before she buys her ticket. While she is gone there is an alteration to the timetable and the train is now going to stop at Homesville. The guard tells Ian about this change and Ian sets off to find Sally to tell her but before Ian finds her, the guard meets Sally and tells her: "The train will now stop at Homesville.". Ian eventually finds Sally who has just bought her ticket.

#### **TOM Question:**

Which station does Ian think that Sally has bought her ticket for?

#### **Memory Question:**

Where has Sally really bought her ticket for?

### **Second Order Deception - Prediction**

Burglar Bill has just robbed a bank and is running away from the police when he meets his brother Bob. Bill says to Bob: "Don't let the police find me, don't let them find me!", then he runs off and hides in the church yard. The police have looked everywhere for Bill except the church yard and the park. When they come across Bob they were going to ask him: "Where is Bill? Is he in the park or the church yard?". But the police recognise Bob and they realise that he will try to save his brother. They expect him to lie and so wherever he tells them, they will go and look in the other place. But Bob, who is very clever and does want to save his brother, knows that the police don't trust him.

#### **TOM Question:**

Where will Bob tell the police to look for Bill, in the church yard or in the park? Why?

#### **Memory Question:**

Where is Bill really hiding?

## **Second Order Deception - Explanation**

Peter has bought a can of Coke which he leaves on the table while he goes out to answer the phone. While he is gone, Chubby Charles comes in and takes Peter's drink and puts it into his own locker. Greedy Greg, who is Chubby Charles's friend, sees what Charles has done and so Charles promises Greg half of the drink if he doesn't let Peter know where his Coke is. Meanwhile Peter has gone looking for his can of Coke and he has searched everybody's lockers except for Nasty Nina's and Chubby Charles's. He sees Greedy Greg and he asks him: "Where is my can of Coke, is it in Charles's or Nina's locker?". Peter knows that Greg and Charles are good friends and so he expects Greg to protect Charles. Greg is very cunning though and he says: "Your Coke is in Charles's locker."

### **TOM Question:**

Why does Greg tell Peter that his Coke is in Charles's locker?

### **Memory Question:**

Where is the Coke really?

### Symptom Rating Scale

Number.....

#### Summary

Symptom group =

% Of Behavioural Signs .....

% Of Passivity Phenomena .....

% Of Paranoid Delusions .....

#### Behavioural Signs

##### **1. Lack of Appropriate Emotion (CPRS - 45) - Observation**

Representing blunting of affects as shown by lack of emotional expression, or the occurrence of incongruous emotional displays which are clearly out of keeping with the situation.

Distinguish from apparent sadness (41) and elated mood (42):

0 Appropriate affect in keeping with mood.

1 Apparent lack of concern, slightly odd displays of emotion.

2 Responds in a clearly inappropriate way on sensitive issues, or appears not to respond at all.

3 Only clearly bizarre emotional responses, or total emotional indifference.

##### **2. Unchanging Facial Expression (SANS - 1) - Observation**

The patient's face appears wooden, mechanical and frozen. It does not change expression or change less than normally expected as the emotional content of discourse changes. Since phenothiazines may partially mimic this effect, the interviewer should be careful to note whether or not the patient is on medication.

0 - Not at all. Patient is normal or labile.

1 - Questionable decrease.

2 - Mild. Occasionally the patient's expression is not as full as expected.

3 - Moderate. Patient's expressions are dulled overall, but not absent.

4 - Marked. Patient's face has a flat 'set' look, but flickers of affect arise occasionally.

5 - Severe. Patient's face looks 'wooden' and changes little, if at all throughout the interview.

##### **3. Paucity of Expressive Gestures (SANS - 1) - Observation**

The patient does not use his body as an aid in expressing his ideas, through such means as hand gestures, sitting forward in his chair when intent on a subject, leaning back when

relaxed, etc. This may occur in addition to decreased spontaneous movements.

0 - Not at all. Patient uses expressive gestures normally or excessively.

1 - Questionable decrease.

2 - Mild. Some decrease in expressive gestures.

3 - Moderate. Patient uses body as an aid in expression at least three or four times.

4 - Marked. Patient uses body as an aid in expression only once or twice.

5 - Severe. Patient never uses body as an aid to expression.

#### **4. Affective Non-Responsivity (SANS - 5) - Observation**

Failure to smile or laugh when prompted may be tested by smiling or joking in a way which would usually effect a smile from a normal individual. The examiner may also ask, "Have you forgotten how to smile?" while smiling himself.

0 - Not at all.

1 - Questionable decrease.

2 - Mild. Slight but definite lack in responsivity.

3 - Moderate. Patient occasionally seems to miss the cues to respond.

4 - Marked. Patient seems to miss the cues to respond most of the time.

5 - Severe. Patient essentially unresponsive, even on prompting.

#### **5. Lack of Vocal Inflections (SANS - 6) - Observation**

While speaking the patient fails to show normal vocal emphasis patterns. Speech has a monotonous quality, and important words are not emphasised through changes in pitch or volume. Patient may also fail to change volume with changes of subject so that he does not drop his voice when discussing private topics or raise it as he discusses things which are exciting or for which longer speech might be appropriate.

0 - Not at all. Normal vocal inflection.

1 - Questionable decrease.

2 - Mild. Slight decrease in vocal inflections.

3 - Moderate. Interviewer notices several instances of flattened vocal inflection.

4 - Marked. Obvious decrease in vocal inflection.

5 - Severe. Patient's speech is a continuous monotone.

#### **6. Poverty of Content of Speech (SANS - 9) - Observation**

Although replies are long enough so that speech is adequate in amount, it conveys little information. Language tends to be vague, often over-abstract or over-concrete, repetitive, and stereotyped. The interviewer may recognise this finding by observing that the patient has spoken at some length but has not given adequate information to answer the question. Alternatively, the patient may provide enough information, but require many words to do so, so that a lengthy reply can be summarised in a sentence or two. Sometimes the interviewer may characterise the speech as 'empty philosophising'.

#### *Exclusions*

This finding differs from circumstantiality, in that the circumstantial patient tends to provide

a wealth of detail.

*Example*

Interviewer: "Why is it, do you think, that people believe in God?"

Patient: "Well, first of all because, he uh, he are the person that, is their personal saviour. He walks with me and talks with me. And uh, the understanding that I have um, a lot of peoples, they don't really uh know they own personal self. Because, uh, they ain't, they all, just don't know they personal self. They don't know that he uh, seemed like to me, a lot of 'em don't understand that he walks and talks with them."

0 - No poverty of content of speech.

1 - Questionable.

2 - Mild. Occasional replies are too vague to be comprehensible or can be markedly condensed.

3 - Moderate. Frequent replies are vague or can be markedly condensed to make up at least a quarter of the interview.

4 - Marked. At least half of the patient's speech is composed of vague or incomprehensible replies.

5 - Severe. Nearly all the speech is vague, incomprehensible or can be markedly condensed.

#### **7. Incoherent Speech (CPRS - 57) - Observation**

Representing circulatory disorganised or apparently illogical speech with inexplicable shifts from topic to topic, distortion and fragmenting of syntax, and words.

Distinguish from flight of ideas.

0 - Coherent and understandable speech.

1 - Pedantic and slightly circumlocutory speech. Some idiosyncratic but comprehensible use of words or phrases, especially under stress.

2 - Illogical association between words or phrases, even when not under stress. 'Knight's move' shifts.

3 - Obviously disjointed and illogical speech. Fragmentation.

#### **8. Decreased Spontaneous Movements (SANS 2) - Observation**

The patient sits quietly throughout the interview and shows few or no spontaneous movements. He does not shift position, move his legs, move his hands etc., or does so less than normally expected.

0 - Not at all. Patient moves normally or is overactive.

1 - Questionable decrease.

2 - Mild. Some decrease in spontaneous movements.

3 - Moderate. Patient moves three or four times during the interview.

4 - Marked. Patient moves once or twice during the interview.

5 - Severe. Patient sits immobile throughout the interview.



## **9. Conceptual Disorganisation (BPRS - 4) - Observation**

Degree to which the thought processes are confused, disconnected or disorganised. Rate on the basis of integration of the verbal products of the patient; do not rate on the basis of the patient's subjective impression of his own level of functioning.

- 0 - Not present
- 1 - V mild
- 2 - Mild
- 3 - Moderate
- 4 - Mod severe
- 5 - Severe
- 6 - X severe

## **10. Poverty of Speech (SANS 8) - Observation**

Restriction in the *amount* of spontaneous speech, so that replies to questions tend to be brief, concrete and unelaborated. Unprompted additional information is rarely provided. Replies may be monosyllabic and some questions may be left unanswered altogether. When confronted with this speech pattern, the interviewer may find himself frequently prompting the patient in order to encourage elaboration of replies. To elicit this finding, the examiner must allow the patient adequate time to answer and to elaborate his answer.

- 0 - No poverty of speech. A substantial and appropriate number of replies to questions include additional information.
- 1 - Questionable poverty of speech.
- 2 - Mild. Occasional replies do not include elaborated information even though this is appropriate.
- 3 - Moderate. Some replies do not include appropriately elaborated information, and some replies are monosyllabic or very brief ("Yes." "No." "Maybe." "I don't know" "Last week.").
- 4 - Marked. Answers are rarely more than a sentence or a few words in length.
- 5 - Severe. Patient says almost nothing and occasionally fails to answer questions.

## **11. Global Rating of Affective Flattening (SANS - 7) - Observation**

The global rating should reflect on overall severity of affective flattening or blunting. Special emphasis should be given to such core features as unresponsiveness, inappropriateness, and an overall decrease in emotional intensity.

- 0 - No flattening. Normal affect.
- 1 - Questionable affective flattening.
- 2 - Mild affective flattening.
- 3 - Moderate affective flattening.
- 4 - Marked affective flattening.
- 5 - Severe affective flattening.

## **Passivity Phenomena**

### **1. Hallucinatory Behaviour (BPRS - 12) - Questioning**

Perception without normal external stimulus correspondence. Rate only those experiences which are reported to have occurred within the last week and which are described as distinctly different from the thought and imagery processes of normal people.

- 0 - Not Present
- 1 - V Mild
- 2 - Mild
- 3 - Moderate
- 4 - Mod Severe
- 5 - Severe
- 6 - X Severe

### **2. Feeling Controlled (CPRS - 29) - Questioning**

Representing the experience of being in the literal sense influenced or controlled from without, and the experience that feelings, impulses, or volition's are imposed from without.

Also rated under this heading is the experience of being able to control others in a similar manner.

Distinguish from disrupted thoughts (10) and ideas of persecution (13).

- 0 - Ordinary influence from social forces.
- 1 - Vague or unconvincing report of being unnaturally influenced from without.
- 2 - Occasional but clear experiences of being controlled from without, e.g. by means of hypnosis.
- 3 - Continuous experiences that feelings or impulses do not derive from oneself, but are forced into one, say by means of rays.

### **3. Disrupted Thoughts (CPRS - 30) - Questioning**

Representing the experience of a sudden stoppage of thoughts (thought blocking), or thoughts being put into one's head (insertion), or being taken out (withdrawal), or listened to or broadcast.

Distinguish from compulsive thought, and concentration difficulties.

- 0 - No thought interruptions.
- 1 - Vague or unconvincing reports of episodes or interruptions to thought.
- 2 - Occasional but clear thought blocking or occasional episodes of thought insertion or withdrawal. Feeling that thoughts are being read.
- 3 - Disturbing or disabling thought interruptions. Thought broadcasting.

## **Paranoid Delusions**

### **1. Ideas of Persecution (CPRS - 31) - Questioning**

Representing suspiciousness, exaggerated self-consciousness, the conviction of being talked about or watched or persecuted with malicious intent.

0 - No undue suspiciousness or self-consciousness.

1 - Vague feelings of being observed. Occasional suspicions of malice.

2 - Pervasive feelings of being talked about, threatened or persecuted.

3 - Unalterable conviction of being the victim of systematic persecution. Delusional misinterpretation of ordinary events of 'cues'. Conviction of being referred to beyond the realm of likelihood (for example on television or in newspapers).

Appendix iii.  
Written Confirmation of Ethical Approval

HOSPITAL AUTHORITY

Mr David Murphy  
Psychology Department  
Hospital

10 October 1996

Dear Mr Murphy,

I am writing to inform you that, at its meeting on 8 October, the Ethics Committee approved your project entitled

'Theory of Mind in a sample of individuals with schizophrenia in a Special Hospital: its relationship to symptom profiles and attainment on conventional cognitive tests'

Yours sincerely

Secretary to the Ethics Committee

cc: Dr Mary Hill

**Letter Written To RMO Asking Permission To Approach Individual Patients**

**Dr**

**RMO:.....Ward**

November, 1996

Dear Dr .....

**Re: A Study of 'Theory of Mind' Abilities Amongst Patients With a Clinical  
Diagnosis of Schizophrenia**

As a past assistant psychologist in the Psychology Department at ....., I have returned to the hospital for a clinical placement between October 1996 and March 1997 as a part of clinical training programme (Oxford Regional In-Service Training Scheme). I am hoping to carry out a research dissertation in part fulfilment of my doctorate of Clinical Psychology qualification which will build on the existing treatment resistant schizophrenia research which has been carried out by Drs ..... & ....., and would ask your agreement to include some patients from ..... ward.

The present project will examine Frith's (1992) model of 'Theory of Mind' in schizophrenia according to differing symptom subgroups and will consider the performance of patients in specific tasks in relation to their attainment on conventional cognitive tasks.

There are ... patients on ..... ward whom I would like to approach;

Number	Name
--------	------

It is anticipated that sessions will take about 30/40 minutes and that the measures will include;

1. A psychiatric rating checklist devised from specific items of; the Scale for the Assessment of Negative Symptoms (SANS) (Andreason, 1989), the Comprehensive Psychiatric Rating Scale (CPRS) (Ashberg et al., 1978) and the Brief Psychiatric Rating Scale (BPRS) (Overall & Gorham, 1962). This part of the work is carried out in consultation with Dr .....
2. A Theory of Mind test. Briefly, this is composed of six short stories devised by Happé (1994). After reading out each story two questions are asked. The first requires an interpretation of a story character's behaviour based on their 'mental state'. The second asks for a piece of information to be recalled which is crucial to

the comprehension of the story, but not to the interpretation of mental state (i.e. reality / memory test question).

Approval from the ..... Ethics Committee has been obtained and confidentiality will be maintained throughout. Each patient will also be asked for their written consent using the attached form. If you have any queries regarding the research or would like more information, I would be happy to discuss it further. I am currently on a six month clinical placement and can be reached in the psychology department (Extension .....). My research supervisor is Dr .....

Your sincerely,

Clinical Psychologist in Training

**Appendix v**  
**Written Outline & Patient Consent Form**

**CONSENT AND INSTRUCTIONS FOR PATIENTS**

My name is ..... I am a psychologist who has worked at ..... in the past and now returned as part of my training to become a clinical psychologist. I am also carrying out some research to the hospital as part of my studies and would be grateful for your help in this.

The purpose of the research is to find out more about how people understand the thoughts and intentions of others. New research suggests that these abilities are important in understanding some illnesses and in planning treatment. You will be read a series of six short stories and then be asked some questions about them.

It is important to know how you feel when you do these tasks and I would also like to ask you some further questions about your current health and morale, using a short questionnaire which you have completed in the past for a colleague.

Altogether, the session should not take more than an forty minutes. Do you have any questions? Thank you very much for your help.

I agree to take part in this project, which has been discussed with me. My results will be used anonymously for this research and will not be used in any other way unless I give further written consent to do this.

Signature.....